JOINT FORCES STAFF COLLEGE
JOINT ADVANCED WARFIGHTING SCHOOL

JOINT SPACE FORCES IN THEATER: COORDINATION IS NO LONGER SUFFICIENT

by

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The contents of this paper reflect my own personal views and are not necessarily endorsed by the Joint Forces Staff College or the Department of Defense.

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ABSTRACT

The role of space operations in the United States military has matured significantly since the end of the Cold War. The transformation from strategic applications to tactical integration has increased the demands for effects achievable through joint space capabilities on and off the battlefield. The explosive growth of and demand for joint space capabilities have outstripped the joint community's ability to provide unifying doctrine and a command and control structure to meet the demands. Consequently, the military services have independently developed solutions and doctrine to meet the needs of their respective joint force component commander.

The thesis of this research is the US military must create a jointly focused command and control organization to meet the Joint Force Commander's growing demand for synchronized joint space capabilities. Although joint doctrine addresses the need for a space coordinating authority (SCA) separate from a commander to achieve space superiority, it does not provide sufficient joint authority to effectively execute the SCA role. Consequently, the Joint Force Air Component Commander has attempted to combine the roles in the Joint Air Operations Center resulting in a less than optimum integration of space into US joint warfighting.

To establish clear lines of authority and enable a joint forces wide perspective of space power, a Joint Space Synchronization Authority supported by a Joint Space Synchronization Officer, Theater Space Integration Cell, and Joint Space Superiority Cell is proposed. While these organizations could operate independently of each other at different locations, the greatest synergy is obtained by co-locating them in a Joint Space Integration Division in the JAOC. This construct allows for a jointly recognized and focused approach to space force synchronization and integration across all components.

CONTENTS

Page

ABOUT THE AUTHOR ii

ACKNOWLEDGEMENTS iii

ABSTRACT iv

INTRODUCTION 1
- Methodology 2
- Thesis Overview 3

THE BIRTH OF TACTICAL SPACE APPLICATIONS 6
- Evolution of Space in War: The Cold War 7
- Evolution of Space in War: Operation Desert Storm through the 1990s 8
- Evolution of Space in War: The Turn of the Century 15
- The Challenge of Unifying Military Space Power 24
- Summary 26

SPACE DOCTRINE—JOINT OR JOINED? 28
- Current Joint Doctrine for Space Operations 29
- Service Perspectives for Space Operations 32
- Summary 53

SYNCHRONIZING JOINT SPACE FORCES 54
- Defining Authority: Words Matter 55
- Organizing to Execute Joint Space Requirements 64
- Summary 69

CONCLUSION 71

GLOSSARY 75

BIBLIOGRAPHY 77

ILLUSTRATIONS

Figure Page

1. Position of TongaSat and Congestion in the Geosynchronous Orbit. 22

2. Progression of Space Effects in Operations 24

3. JAOC Organization. 39

4. Joint Air Tasking Cycle 43

5. JFACC responsibilities for space operations 49

6. All Elements and Stakeholders of National Space Power 61

7. Organization of the Joint Space Integration Division 67

8. Location of the JSID in the JAOC organization. 68

TABLES

Table 1. Definitions Associated with Commanders' Authorities 56

INTRODUCTION

> *Preparing for the future will require us to think differently and develop the kinds of forces and capabilities that can adapt quickly to new challenges and to unexpected circumstances. An ability to adapt will be critical in a world where surprise and uncertainty are the defining characteristics of our new security environment.*
>
> SecDef Donald H. Rumsfeld
> Remarks to the National Defense University
> 31 Jan 02

The environment that space power theorists and planners are operating within is in rapid transformation. Driving this transition is not as much the growth of the number of space systems in orbit, as it is the fundamental shift from strategic application to operational, tactical and practical integration of space capabilities at the lowest echelons in the battlespace and in everyday civilian life. Since the first launch and application of space capabilities more than 50 years ago, space has supported national strategy aims at the strategic level. Since Operation Desert Storm in 1991, space capabilities have dramatically shifted from supporting only national, strategic aims to operational and tactical enablers of individual Airmen, Soldiers, Sailors and Marines in combat. This transition was further accelerated by Operation Iraqi Freedom. The idea of the United States going to battle with non-space enabled command and control systems and weapon systems is an abandoned concept within the United States military. The ability to enhance a joint force's speed, precision, and lethality through linked networks in the operational environment is the main underpinning of the Pentagon's transformation strategy. The future military will be even more dependent on space than it is today. As network centric or network enabled warfare grows in maturity, space capabilities will

become foundational to the American way of war. The evolution of space capabilities from add-on force enhancers to a central warfighting capability requires military leaders and joint planners to address optimizing these capabilities to support a Joint Force Commander's campaign. The thesis of this research is the US military must create a jointly focused command and control organization to meet the Joint Force Commander's growing demand for synchronized joint space capabilities.

Methodology

This study looked at three primary changes in the strategic environment that are expanding the Joint Force Commander's role in space operations: the increased demand at the operational and tactical levels of war for joint space effects; the growing mission of space control which includes defense of friendly space capabilities from attack and offensive action to deny or disrupt adversary use of space capabilities; and the increased need for a single authority to plan, synchronize, and optimize space effects across the entire joint force.

Research was conducted with emphasis on primary sources to document and establish how these factors are changing the nature of warfare. Additionally, joint and service doctrine was analyzed to determine where there is similarity as well as fragmentation in each military service's approach to the integration of space effects into theater operations. Analysis revealed that a synchronizing authority and new organizational concept are needed to meet the increased demands on space operations planning and execution in support of a Joint Force Commander.

The traditional approach to theater space integration leaves the responsibility to each service to integrate space effects for its Component Commander but synchronization across all components is neglected. The Army deploys Army Space Support Teams (ARSST) and Space Support Elements (SSE) to support the Joint Force Land Component Commander (JFLCC). The Air Force deploys a Director of Space Forces (DIRSPACEFOR) and augments the Joint Air Operations Center (JAOC) with space personnel to support the Joint Forces Air Component Commander (JFACC). The Navy and Marines rely on individual ship and Marine Air Ground Task Force (MAGTAF) commanders to determine and meet Joint Force Maritime Component Commander (JFMCC) space requirements.

Although joint doctrine gives the Joint Force Commander (JFC) the authority to designate a Space Coordinating Authority (SCA)[1], space operations remain focused within service needs. This approach fragments space operations across the joint force hindering a synergistic and joint approach to the integration of space effects in the operational environment. A more robust command and control approach is required to integrate and synchronize space effects into the operational and tactical levels of war.

Thesis Overview

Chapter One of this paper presents a historical examination of the transformation of space applications from the strategic to the operational and tactical levels. As space capabilities became more prevalent in the American way of war, the demand to improve the flow of information from traditional space force enhancement functions also grew. At the same time, the strategic environment changed and new threats to US space

[1] JP 3-0, Joint Operations, 17 September 2006, III-7

operations emerged emphasizing the need for robust planning and execution of the space control mission.

Chapter Two discusses the fragmented and asynchronous development of joint space warfighting guidance. A comparison of current joint and service doctrine is presented to reveal that each service has developed capabilities to support individual service needs instead of the joint force. This results in duplicate efforts and missed opportunities to build synergy from all space forces available to the joint force commander.

Chapter Three presents options to enable the JFC and specifically the JFACC to effectively execute the space superiority mission and the responsibility to integrate and synchronize space effects across the joint force. The chapter presents a new Joint Space Synchronization Authority to replace the ineffective Space Coordination Authority. The foundation of this new approach to managing US military space assets is derived from the model created by United States Special Operations Command (USSOCOM) in their mission to synchronize the Department of Defense's efforts in the Global War on Terror (GWOT). A Theater Space Integration Cell (TSIC) is proposed to directly support the Joint Space Synchronization Authority. The final organization is directed at reorganizing the Joint Air Operations Center to create a body of space expertise in a Joint Space Superiority Cell (JSSC). If combined, the two cells would create a new Joint Space Integration Division in the Joint Air Operations Center.

Although the discussion is built around enhancing space organizations in the Joint Air Operations Center, these concepts and organizations can be applied or located anywhere the Joint Force Commander designated. In the end, this discussion may only

be a stepping stone towards the eventual creation of a Joint Force Space Component Commander.

Command and control of space forces is a topic that has generated significant and heated discussion over the past few years. One point that is universally agreed to is the foundation that "space is inherently Joint." This paper is written to present concepts to optimize joint operations for space. As Alfred Thayer Mahan stated, "The unresting progress of mankind causes continual change in the weapons; and with that must come a continual change in the manner of fighting."[2] Space capabilities have changed to become an integral weapon of war; therefore, the United States' manner of fighting must change as well.

[2] A.T. Mahan, *The Influence of Sea Power upon History 1660-1783* (New York: Dover Publications, Inc. 1987)

CHAPTER 1

THE BIRTH OF TACTICAL SPACE APPLICATIONS

From the dawn of time, a key to victory on the battle field has been to control the high ground. Space is the ultimate high ground.

Secretary of Defense Donald H. Rumsfeld Testimony
Prepared for the House Armed Services Committee
Defense Budget Request, February 6, 2002

On August 31, 2006, President George Bush signed a new National Space Policy establishing updated overarching guidance to govern the development and conduct of US space activities.[3] Since President Eisenhower, space has played a significant strategic military role, but the majority of national and military leaders neither understood nor appreciated the criticality space operations played in the conduct of modern military operations until Operation Desert Storm. Now, according to former Secretary of the Air Force James Roche, "space is like oxygen—when you've got it, you take it for granted; but when you lose it, it's the only thing you really want."[4] Space systems are interwoven into every part of the American fabric and "unrestricted use of space has become a strategic interest of the United States."[5] This chapter will broadly trace the development of military space from its strategic foundations to recent tactical applications in the battlespace and discuss how these changes impacted the strategic environment and the

[3] Presidential Decision Directive/National Science and Technology Council, "United States National Space Policy," (31 August 2006): Internet, available from http://www.ostp.gov/html/US%20National%20Space%20Policy.pdf, accessed on 21 November 2006
[4] Quoted in General Lance W. Lord, Commander Air Force Space Command, address to the 2005 Air Force Defense Strategy and Transformation Seminar Series, Capital Hill Club, 9 March 2005: Internet, available from www.dfigov.com/Files/Lord_Seminar_Transcript_9Mar%2005.doc, accessed 20 November 2006.
[5] National Defense Panel, *Transforming Defense: National Security in the 21st Century* (Arlington, VA.: National Defense Panel, December 1997), 38, quoted in General Thomas S. Moorman Jr., "The Explosion of Commercial Space and the Implications for national Security," *Airpower Journal*, XIII, no.1 (Spring 1999): 7.

military's approach to space power. This chapter shows how the demand for space effects in the battlespace also resulted in recognition of the need to defend highly vulnerable space systems. Additionally, the emergence of the space control mission combined with an insatiable appetite for traditional space force enhancement capabilities created additional demands for centralized command and control.

Evolution of Space in War: The Cold War

The foundation of America's interest in space is solidly rooted in strategic deterrence and the nuclear arms race with the Soviet Union. The nation was pulled into the space age through the development of intercontinental ballistic missiles (ICBMs) and President Eisenhower's determination to protect the nation from surprise attack.[6] With the threat of nuclear war looming, space systems focused on space based photo reconnaissance, missile warning, communications and terrestrial weather. The highly classified nature of these systems shielded them from compromise, but also served as a barrier to integrating them with operations by limiting who had knowledge of the benefits of the systems.

Space was relevant at the highest levels of command providing technical means backed by national policy guiding its application. At the operational and tactical level it was nearly non-existent or inflexible at best. The thought of space systems as a vulnerability within US operations was not even a consideration. Significant change did not occur until 30 years later in the 1990s and Operation Desert Storm.

[6] David N. Spires, *Beyond Horizons: A Half Century of Air Force Leadership*, revised edition (Maxwell AFB, AL: Air University Press, 1998), xv.

Evolution of Space in War: Operation Desert Storm through the 1990s

The end of the Cold War also initiated an end to the strategic mindset of the nation's military space community. The gradual migration away from preventing global nuclear war and toward regional conflicts also affected military space planners as they slowly shifted toward theater operations and integration. According to Major Schuler, an Air Force space weapons officer, "the 30-year focus of space capabilities on national strategic missions meant long neglect of developing capabilities, processes, and procedures that would integrate space into the nation's conventional warfare capacity. Not surprisingly, theater warfighters and the space community both entered the 1990's lacking a comprehensive understanding of each other's requirements and capabilities. Saddam Hussein provided the initial impetus for change by attacking Kuwait in August of 1990."[7]

Space Systems

In the Department of Defense's final report to congress, Operation Desert Storm "was the first conflict in history to make comprehensive use of space systems support."[8] For the first time in history, space capabilities were broadly integrated into the American way of war at the operational and tactical levels. The strategic core of space: photoreconnaissance, missile warning, weather, and communications, was expanded with new capabilities of precision navigation, commercial multi-spectral imagery, commercial SATCOM, and the Tactical Information Broadcast Service (TIBS) feeding the common operating picture. With the expansion of capabilities, space operations proved to be the

[7]Major Mark A. Schuler, "Building a True Air and Space Operations Center: Are We There Yet?" (Masters Thesis, School of Advanced Air and Space Studies, Air University, 2006), 13.
[8] Department of Defense, *Conduct of the Persian Gulf War: Final Report to Congress* (Washington D.C.: April 1992), 227.

ultimate information provider and force enhancement tool to theater combatants.[9] Many of the changes were the result of adapting strategic thinking and systems to a new environment.

Space based intelligence from military and commercial sources proved invaluable in the conduct of the war. Because imagery proved so critical to targeting and battle damage assessment, the Department of Defense (DoD) reported that the theater's "insatiable appetite for imagery and imagery-derived products could not be met."[10] Lieutenant General William M. Keys, USMC Commanding General 2nd Marine Division during Operation Desert Storm commented, "At the strategic level, [intelligence] was fine. But we did not get enough tactical intelligence, front-line battle intelligence."[11] Reconnaissance satellites, often referred to as "national" systems, provided detailed images but remained limited in their field of view and the classification of their products limited distribution.[12] Military planners augmented US systems with wide angle of view commercial US LANDSAT and French SPOT imagery for a verity of applications from map making to environmental analysis with multi-spectral imagery (MSI).

Missile warning also saw significant changes as it transformed from a strategic mission to tactical application. The Defense Support Program (DSP), originally designed to detect long range intercontinental and submarine launched ballistic missiles, had to reduce reporting timelines and criteria to counter the growing theater ballistic missile threat. Working in the strategic context, missile warning timelines required approximately five minutes from detection to warning to pass through the various

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[9] Tom Clancy and General Charles Horner, *Every Man a Tiger*, (New York, NY: G.P Putnam's Sons, 1999), 516.
[10] DoD, *Conduct of the Persian Gulf War*, C-8
[11] Ibid.
[12] Spires, 262.

agencies that needed to process the information.[13] In the framework of nuclear war, absolute certainty of launch was required. With the new tactical environment speed was critical. With a maximum flight time of about seven minutes, Scud missile warning had to be faster than the strategic process. Through deploying local terminals and changing warning release criteria to accept the possibility of reporting false alarms in exchange for faster reporting, timelines decreased to 90 seconds from detection to warning.[14] These efforts proved successful by detecting all 88 Scud launches during the war and providing military personnel and civilians enough time to "duck and cover."[15] Additionally, the added integration with Patriot missile batteries proved an effective theater missile defense.

When Coalition forces commenced the war in Iraq, they encountered the worst weather experienced in the Gulf region in 14 years. According to Air Force Chief of Staff General Merrill McPeak, "weather conditions were at least twice as bad as the worst-case estimates."[16] Weather not only affected ground and air movements, but weapon selection, intelligence, and battle damage assessment as well. Sudden weather changes with widely varying extreme conditions made weather forecasting very unpredictable forcing planners to rely on near real-time space based weather data. DMSP data proved so invaluable the Joint Force Air Component Commander kept "a light table next to his desk to review the latest DMSP data."[17] Even General Norman Schwarzkopf, commander-in-chief of US Central Command "always kept the most current DMSP data

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[13] Ibid., 254
[14] Ibid., 254-255.
[15] *Gulf War Air Power Survey Vol IV*, (Washington, D.C.: Library of Congress, 1993), 280. available from http://www.airforcehistory.hq.af.mil/publications/fulltext/gulf_war_air_power_survey-vol4.pdf; Internet; accessed 11 November 2006.
[16] Ibid., 257.
[17] DoD, *Conduct of the Persian Gulf War*, 228.

within arms reach for quick reference.[18] DMSP data enabled operational planning by providing soil moisture analysis for conducting the famous "left hook" into Iraq, ensuring maneuver units would not get bogged down in mud.[19] Current weather data proved critical for laser guided and optically guided precision weapons that relied on clear weather for accurate target designation. Like space based weather data, satellite communications became a critical capability for coalition forces.

Communication satellites exploded in importance and impact during Desert Storm. According to the final Department of Defense report, "For the first time in history, satellite communications for both inter- and intra-theater played a major role in the combat forces' deployment, support, and C^2 [command and control]."[20] Over 90 percent of inter-theater communications were carried over SATCOM with about 24 percent of those communications traveling over commercial satellites.[21] Long-haul communications were the critical link enabling reachback support to the deep infrastructure in the United States for intelligence, logistics, command and control and procurement. The DoD final report states, "Military satellite communications (MILSATCOM) formed the C^2 backbone and highlighted the growing dependence on MILSATCOM to provide operational flexibility tailored to prioritized C^2 needs."[22] Although military satellites proved invaluable, they couldn't meet the growing demands for bandwidth alone, commercial and allied satellites were also employed to fill the gap.

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[18] Spires, 258.
[19] Benjamin S. Lambeth, "The Synergy of Air and Space," *Aerospace Power Journal*, Summer 1998:7; available from http://www.airpower.maxwell.af.mil/airchronicles/apj/apj98/sum98/lambeth.pdf; Internet; accessed 11 November 2006
[20] DoD, *Conduct of the Persian Gulf War*, K-31.
[21] United States Space Command, *United States Space Command Operations Desert Shield and Desert Storm Assessment*, January 1992, 49, available from http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB39/document10.pdf; Internet; accessed 11 November 2006.
[22] DoD, *Conduct of the Persian Gulf War*, K-31.

By the conclusion of the war, a military and commercial network of ten different satellite systems supported all aspects of combat from strategic to tactical.[23] Although SATCOM made a visible impact on operations, the biggest mark may have been achieved by space based navigation.

The Global Positioning System (GPS) proved a significant force enabler and according to US Space Command's post war assessment GPS was characterized as "perhaps the most visible example of space systems support to US troops in Operations Desert Shield and Desert Storm."[24] For the first time, a space system that was built for the tactical user was employed in combat with resounding success.[25] Every component operating in the battlespace leveraged GPS capabilities. Land forces navigated across the featureless desert. Air forces attacked targets in bad weather and at night. GPS supported mine clearing operations at sea and Tomahawk Land Attack Missile (TLAM) accuracy increased by knowing precise launch locations.[26] The demand for GPS in combat quickly outstripped the military's ability to supply its forces. US Space Command assessed that "because of the immediate need for GPS receivers, US and Coalition forces were forced to rely heavily on commercial GPS receivers. Almost 90% of the GPS receivers used by US forces were commercial, non-crypto-capable receivers…procured in the most expeditious manner possible."[27] The widespread tactical application of space effects proved to be an invaluable resource that helped shape the American way of war and started a trend for future development.

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[23] USSPACECOM, *Operations DESERT SHIELD and DESERT STORM Assessment,* 4.
[24] Ibid., 27.
[25] Air Force Space Command, *Desert Storm "Hot Wash", 12-13 July 1991*: 4, available from http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB39/document7.pdf.; accessed on 11 November 2006
[26] USSPACECOM, *Operations DESERT SHIELD and DESERT STORM Assessment,* 27.
[27] Ibid. By war's end more than 10,000 commercial GPS receivers were purchased by the DoD.

Stakeholders

As the number of space systems increased and their application migrated to the operational and tactical levels of war, the number of stakeholders in the command and control and use of the effects increased dramatically. Space products and effects on the battlefield now meant individual soldiers, airmen, marines, and sailors were interested users in addition to commanders at the highest levels of the chain of command. As the military services recognized the impact space systems had to operations, greater organizational emphasis was given to equipping and training units to enhance their operations with space capabilities. To better integrate space operations into other core capabilities, the Air Force created Space Support Teams (SSTs) and then established a space division at the US Air Force Weapons School in 1996. The Army followed suit by creating Army Space Support Teams (ARRSTs) and designated space operations as a functional area (FA-40) in 1998.

The military also started a trend of depending on the commercial sector to augment limited military means. What started as a "just in case" policy in the 1950s, grew into a military necessity across all mission areas.[28] The demand for more space systems and space based effects was as a catalyst for change among military decision makers.

Military Perspective

Desert Storm served as the impetus for several trends in space operations. First, military planners worked to morph strategic systems and processes into the tactical battlespace. Maneuver and high speed mobility were key operating principles that

[28] The only exception at this point in time was missile warning. But even this mission area is now augmented with commercially procured end-user software and personal computers.

needed small, mobile ground segments for support. Air Force Space Command noted the need for a mobile DMSP weather terminal observing that existing terminals are very large and difficult to move.[29] Satellite communications suffered from the same issues. The lesson learned from combat was to provide unit level access secure communications, with greater bandwidth (to accommodate imagery), that is jam resistant.[30] As previously mentioned, the missile warning architecture was modified from the ground up to meet theater needs. Accuracy and deliberation required for the nuclear threat mission was traded for speed and extra time to respond. A fundamental shift in the culture of space operations was forming.

More significantly than modifying space systems for operational and tactical applications was the growing realization that the asymmetric advantage the United States enjoyed was fragile and needed to be protected. The mission area of space control was growing in importance. At the end of the decade, General Ralph Eberhart, then Commander of United States Space Command (USSPACECOM), cautioned that integrating capabilities was not enough, the nation needed to invest in protecting them as well.

> Integration has been exactly the right thing to concentrate on these last 5-10 years, as we tried to harness the national systems… Now, we need to make sure we can protect the capabilities that resulted from that integration… I do not think we would be good stewards of space if we only thought about integration. We also need to be spending resources and intellectual capital on space control and superiority… The importance of space control and space superiority will continue to grow as our economy becomes more reliant on space… If we only look at space in terms of integration, in my view, we will fall into the same trap we fell into with the airplane… We [initially] thought of it in terms of intelligence, surveillance, reconnaissance, communications, and weather [support]. If we only think of space in these ways…[it is] a "higher hill"

[29] Air Force Space Command, *Desert Storm "Hot Wash"*, 1.
[30] Air Force Space Command, *Desert Storm "Hot Wash"*, 3.

> as opposed to a center-of-gravity. We have to be able to survey, protect, and negate under this space control mission.[31]

Additionally, the space advantage could be achieved by nearly any other competitor. US access to commercial space products such as French SPOT imagery, commercial communications satellites and the proliferation of commercial GPS receivers prompted military planners to consider adversaries using the same capabilities. Access to space was no longer a privilege reserved only for a superpower. Committing resources to defend US access to space and deny adversaries access was growing in significance.

The decade of the 1990s served as a watershed period spawning huge growth at the operational and tactical levels. Space operators were beginning to look for ways to actively integrate systems and capabilities into the battlespace. When the United States returned to the region for major combat operations starting in 2001, many of the lessons from Desert Storm were applied, and some of the warnings and concerns were realized as well.

Evolution of Space in War: The Turn of the Century

The terrorist attacks of 11 September 2001 ushered in a new strategic environment for the United States. America returned to major combat operations in the Middle East with the experience gained from combat only ten years prior. This time space operations and effects were developed for and pushed to the tactical level from the beginning. Former Secretary of the Air Force James G. Roche stated that "For the first time in our history, space has become an equal partner to air-breathers."[32]

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[31] Peter L. Hays, "Space and the Military", *Space Politics and Policy*, (Norwell, MA: Kluwer Academic Publishers, 2002): 353, quoted in Schuler, *Building a True Air and Space Operations Center*, 25.
[32] Dr. James G. Roche, Secretary of the Air Force. Address. 19th National Space Symposium, Colorado Springs, CO, 9 April 2003.

Space Systems

Operations Enduring Freedom and Iraqi Freedom (OEF/OIF) are not marked by the acquisition of new major space systems, but by integration of existing systems into everyday aspects of combat operations. The integration was so seamless that "many soldiers do not even know that their equipment—or the enemy's—relies on satellites."[33] The exploitation of existing systems highlights the trend toward space technology.

The technological foundation that space systems provided redefined the application of force. GPS guided precision munitions, such as the Joint Direct Attack Munition (JDAM), have become the centerpiece of military planning. Instead of planning how many aircraft it will take to destroy a target, the new focus is determining how many targets an aircraft can destroy. Comparing the number of precision guided munitions dropped in Operation Desert Storm (ODS) to Operation Iraqi Freedom (OIF) highlights the US military's dependence on space technology. During ODS approximately 14,825 precision guided weapons were dropped accounting for 6.5% of the total munitions employed. Although OIF saw a marginal increase to 19,948 precision guided weapons dropped, they accounted for 68% of the total expenditure of weapons for the war.[34] The fielding of GPS guided JDAMs fundamentally changed the American way of war. Lieutenant General Daniel Leaf, Air Component Coordination Element Commander during OIF, commented, "…the idea that you would drop a 2000 pound bomb, through the weather, at night, in a dust storm, in [close] contact, is mind-boggling."[35] Space

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[33] Glen C. Collins, "Space Control Necessary to Fight and Win in the 21st Centaury," *Army Space Journal* (Summer 2002): 6.

[34] Carl Conetta, "Catastrophic Interdiction: Air Power and the Collapse of the Iraqi Field Army in the 2003 War", Commonwealth Institute Project on Defense Alternatives Briefing Memo #30, 26 September 2003. Internet: http://www.comw.org/pda/fulltext/0309bm30.pdf, accessed 24 November 2006.

[35] Adam Hebert, "Toward Supremacy in Space," *Air Force Magazine* 88, no. 1, (Summer 2005): 24.

capabilities that were born out of the strategic era for distinctly national strategic missions enabled blurring of the lines between strategic and tactical missions. Now, a B-52 carrying JDAMs, linked to a combat controller on the ground in Afghanistan by SATCOM (passing GPS coordinates) can provide close air support to troops engaged in combat.[36] This clearly is a divergence from the strategic framework that linked SATCOM and nuclear bombers during the Cold War.

Another enabler of precision warfare is the constant demand for more satellite communications bandwidth. Although Operation Enduring Freedom only saw 11% of the troop strength of ODS, those troops used 388% more bandwidth in 2002 than their predecessors did in 1991; likewise, OIF bandwidth increased by approximately 42 times over ODS levels.[37] Possibly more concerning than the US military increasing its reliance on space capabilities, is the military's growing need to use unprotected, commercial satellites to meet the demand for more capacity. In OIF over 80% of SATCOM bandwidth was supplied by commercial carriers.[38] The US military's dependence on commercial space systems may be creating a critical vulnerability that it cannot fully protect. The increased presence of space operations in the theater of war also lead to an increase in the parties interested in their effects.

Stakeholders

As space capabilities and products became more prevalent at the tactical level the number of units and individuals wanting them increased at all levels of command. What

[36] Peter B. Teets, "National Security Space in the Twenty-First Century," *Air and Space Power Journal* (Summer 2004): 5.
[37] United States Department of Commerce, *Satellite Industry Overview*, 16 December 2004: 43, Internet, www.sia.org/industry_overview/sat101.ppt, accessed 24 November 2006, and Lieutenant General Larry J. Dodgen, "Space – Enabling the Potential of Our Joint Warfighter," *Quest for Space*, (US Army Space and Missile Defense Command, 2005).
[38] United States Department of Commerce, *Satellite Industry Overview*, 16 December 2004: 31.

the US military had not prepared for was the presence of space capabilities employed by its adversary. Although military leadership at the end of Desert Storm warned against the ease of other nations acquiring space capabilities, little planning had taken place to deal with the new threat.[39]

The space advantage was not overlooked by Saddam Hussein in Iraq. The proliferation of commercial handheld satellite phones such as Inmarsat and Thuraya, as well as the ubiquity of commercial GPS receivers enabled nearly any consumer world wide to take advantage of space capabilities. No longer tied to a telecommunications infrastructure in the cities, individuals could stay away from urban areas providing indications and warning of advancing coalition forces and report directly back to command and control centers within seconds. Any person with a satellite handset was now a potential threat. In addition to leveraging commercial access to space capabilities, President Hussein directly threatened the United States' space superiority by acquiring and deploying Russian built Aviaconversia GPS jammers.[40] Although initial plans conceived in coordination with the Russian manufacturer originally called for jammers along the entire boarder of Iraq, the end deployment was limited to just locations in Bahgdad.[41] The superiority of US military encrypted GPS receivers compared to commercial units allowed F-117 and B-1B bombers to target and destroy the jammers with GPS guided munitions.[42] The Iraqi use of GPS jammers as an offensive weapon led

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[39] House Committee on Armed Services, Commission to Assess United States National Security Space Management and Organization, *Report of the Commission to Assess United States National Security Space Management and Organization*, report prepared by Hon. Donald H. Rumsfeld, et.al. 11 January 2001, 100.
[40] Liz Porteus, "Russian Dealers Provide Iraq with Supplies, Electronics" *Fox News* (23 March 2003) available from http://www.foxnews.com/story/0,2933,81917,00.html; Internet; accessed 12 November 2006.
[41] National Air Intelligence Center photograph F-186603, available from http://www.qsl.net/n9zia/wireless/gps_jam-pics.html; Internet; accessed 12 November 2006.
[42] James, "Bringing Space to the Fight," 15.

Secretary of the Air Force James Roche to comment, "The proverbial first shot of space warfare has been fired. As we grow increasingly dependent on space, we can expect a comparable increase in counter-space threats."[43]

The evolution of space capabilities from strategic support to tactical application spawned exponential growth in the national and international space community. The notion that space power is reserved for superpowers or wealthy countries was replaced with the idea that even the smallest actor can become space enabled. The ability to build and operate space capabilities is diffusing to smaller world actors consequently increasing the desire for space systems. Ownership of satellites is no longer required to benefit from them. The growth in commercial space systems and reduction in costs through partnerships, leasing or buying products, and the reduced cost from competition are also making space technology more available. More than forty countries have entered the space age in the last ten years, including India, Pakistan, Nigeria, Chile, Argentina, China, and Morocco.[44] This dispersion of technology could be interpreted as competition to US technological dominance and a threat to its asymmetric advantage. Author Martin van Creveld asserts that technology in society, and specifically in warfare, has evolved beyond just linking machines together, it is now a philosophy of its own that affects "not only the way war is conducted…but the very framework that we use for thinking about it".[45] This not only applies to the US who possesses highly advanced weapon systems, but it encourages smaller actors to seek ways to gain the same advantages or ways to

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[43] James G. Roche, Address to the AFA National Symposia, Orlando, FL 14 February 2003, available from http://www.afa.org/aef/pub/roche203.asp; Internet; accessed 12 November 2006.
[44] United Nations Registry of Space Launches, 2004, Section A: Main Registry of Satellites and Space Probes, Table 1: Index to registrations, Internet, available from http://planet4589.org/space/un/un_taba1.html, quoted in Col Rex R. Kiziah, "Technologies Necessary to Make Warfighting Space a Reality," *High Frontier* 1, no. 4: 25.
[45] Martin van Creveld, *Technology and War*, (New York, The Free Press, 1991), 232.

deny them to others in an attempt to "level the playing field." The role of space in combat had changed and the perspective of the nation's space professionals needed to change to meet the new threats.

Military Perspective

Although the Iraqi military mounted only a negligible resistance to US space operations, it revealed the ease of which space products and space control capabilities could be obtained and employed. The traditional space force enhancement missions of intelligence, missile warning, communications, weather, and precision navigation and timing continue to provide the foundation for military operations, but the assumption that these services will always be available is no longer valid. Major General Robert Kehler described the new perspective for space operations when he stated, "what we really are talking about is space-enabled warfare and not just using space as a force enhancer."[46] Space warfare requires that military planners and space operators replace the old paradigm that space superiority can be taken for granted. Using space control principles[47], United States forces must plan to gain and then work to maintain the asymmetric advantage they enjoy. Brigadier General Richard Weber who served as the Senior Space Officer to United States Central Command (USCENTCOM) during OEF emphasized the need to change the way military planners approach campaign planning, "If you come up with a plan and wrap space onto it, [that is] not the way to go. The

[46] Robert Kehler, "Space Enabled Warfare," *RUSI Journal*, August 2003 quoted in Daniel D. Wright "Theater Space Warfare: Rewriting the Joint Playbook." Masters thesis, School of Advanced Air and Space Studies, Air University, 2005; 38

[47] According to Joint Publication 3-14, *Joint Doctrine for Space Operations*, space control is defined as "Combat…operations to ensure freedom of action in space for the United States and its allies and, when directed, deny an adversary freedom of action in space. The space control mission area includes: surveillance of space; protection of US and friendly space systems; prevention of an adversary's ability to use space systems and services for purposes hostile to US national security interests; negation of space systems and services used for purposes hostile to US national security interests; and directly supporting battle management, command, control, communications, and intelligence."

change requires a huge evolution in thinking."[48] The United States must plan to take deliberate actions to gain space situation awareness, and conduct defensive and offensive space control operations from the beginning of a joint campaign.

Commercial space systems remain highly vulnerable to disruption and denial of service from ground based jammers. In 2004 General Lance Lord, former commander of Air Force Space Command predicted that adversaries "will increasingly try to deny us the asymmetric advantage that space provides. …Vulnerable space systems invite attack."[49] A number of nations have already accepted that invitation.

In early 1993, the South Pacific island nation of Tonga accused Indonesia of deliberately jamming TongaSat, see Figure 1. The confrontation started when both parties claimed a geosynchronous satellite communications slot. When Tonga moved its national communications satellite into this disputed spot, Indonesia protested. Tonga soon began experiencing difficulties using their satellite which they attributed to Indonesian jamming. Publicly, Indonesia denied the charges. However, Tongan officials claimed that Indonesia boasted about the jamming during talks that eventually resolved the dispute.[50]

[48] Adam J. Hebert, "Toward Supremacy in Space," *Air Force Magazine*, 88, no.1, (January 2005): 25.
[49] Hebert, "Toward Supremacy in Space,": 25.
[50] Island Snapshots: A collection of news-briefs from The Tonga Chronicle, Lao & Hia, Taimi 'o Tonga, Ko e Kele'a, Radio Tonga, *Satellite Slots bring continued disagreements,* http://www.tongatapu.net.to/tonga/news/briefs/ss970227.htm, accessed 10 May 2007.

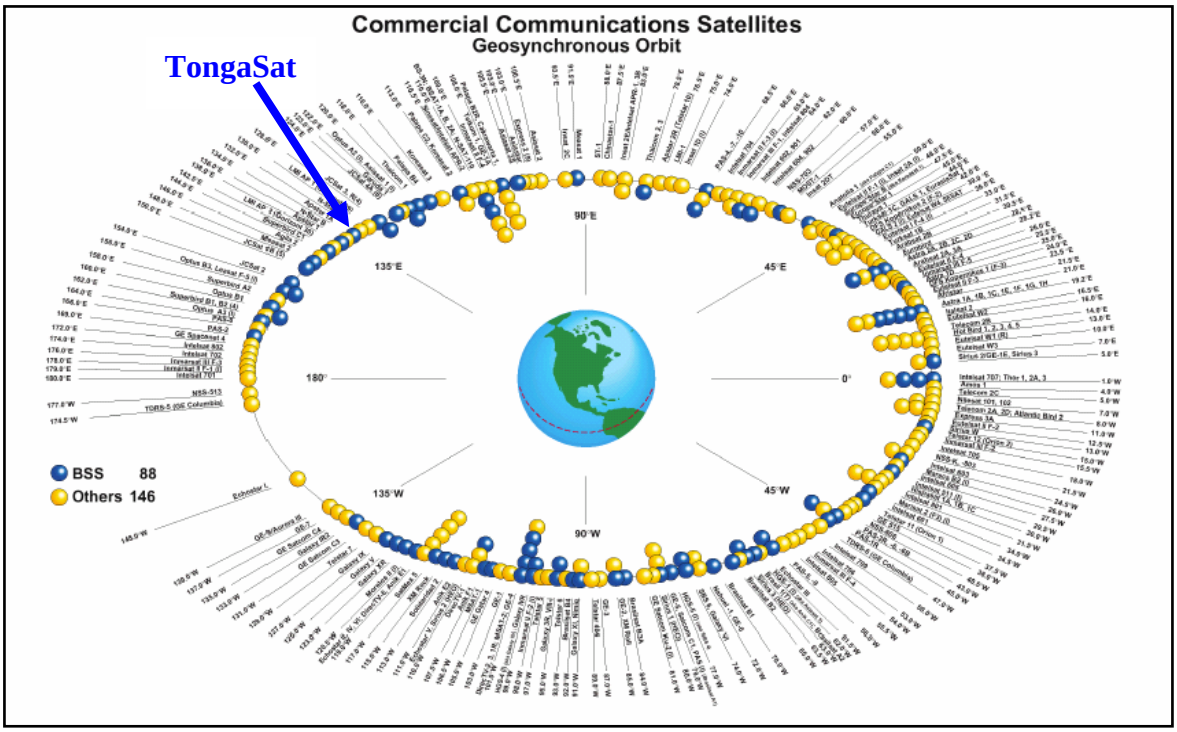

Figure 1. Position of TongaSat and Congestion in the Geosynchronous Orbit. Orbital slots over populated areas are in demand and have generated debate concerning equitable apportionment of locations. Space is "running out of space."[51]

Another incident, which directly impacted the United States, started in the summer of 2003 when Cuba jammed US broadcasts into Iran after the Voice of America began broadcasting new Farsi-language programming into that country. Through the use of military and civilian geolocation services, the source of the signal was identified as originating near Havana.[52]

These two examples represent how vulnerable satellites are to electronic attack. "Satellites are more or less open ports. They take in whatever signal is beamed up and then aim it back down" said Jim Wadiak, head of Transmitter Location Service.

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[51] Adapted from United States Department of Commerce, *Satellite Industry Overview*, (16 December 2004), http://www.sia.org/industry_overview/sat101.ppt, accessed 24 November 2006.
[52] Tom Carter, "Castro Regime Jamming U.S. Broadcasts into Iran," *The Washington Times*, (Washington D.C.), 16 July 2003.

"[Jamming] isn't that hard to do."[53] Simplicity and low cost are fueling the perspective that space control operations are an effective means to gain or minimize a technological edge. Combining the global propensity toward jamming operations with the United States' increased reliance on space systems for commercial and military transformation, the new strategic environment presents a greater risk to US space operations than ever before. The Department of Defense must undertake a wide range of efforts to strengthen its ability to protect and defend space-based assets and the information they carry.

The development of new technologies, such as the Rapid Attack, Identification, Detection, and Reporting System (RAIDRS), to better identify when a satellite is experiencing jamming is a step toward adopting a space warfare culture of thinking.[54] In addition to protecting US space assets, offensive space control systems seek to deny adversaries the ability to leverage the space domain. The Army's Space Control and Electronic Warfare Detachment (SEWD) and the Air Forces' Counter Communications System (CCS) are designed to temporarily disrupt or deny SATCOM transmissions.[55] These defensive and offensive space control systems mark an important first step to preparing for future threats and wars. But these systems are dependant on developing a combat perspective towards space operations. Because the US has never faced a robust challenger in the space domain, operators have been lulled to believe that malfunctions or denials of service are the result of equipment problems instead of deliberate attack.[56] A

[53] Ibid.
[54] The Rapid Attack, Identification, Detection, and Reporting System (RAIDRS) is designed to identify and characterize when jamming is occurring on a signal carried over the satellite it is monitoring. It is composed of a network of sensors integrated into ground tracking stations and located in space on satellites of interest.
[55] Scott Netherland, "Space Control and Electronic Warfare Detachment," *Army Space Journal*, 1, no. 3, (Summer 2002): 27 and Adam J. Hebert, "Toward Supremacy in Space," *Air Force Magazine*, 88, no.1, (January 2005): 25.
[56] Ibid., 24.

key to building the new culture is unifying the military space efforts to optimize space control capabilities.

The Challenge of Unifying Military Space Power

In 2006, Ronald Sega, Under Secretary of the Air Force, and the DoD Executive Agent for Space, identified the improvement and integration of space capabilities across the national security space community, as well as with air, land, and sea-based capabilities as the top priority for Department of Defense space forces.[57] In order to develop space power beyond the integration of effects, which emphasizes filling operational seams, to synchronizing all elements of national space power, emphasizing better defense and control of space assets and improving information flow from space, a unifying command authority is needed to synchronize the efforts of the multiple organizations within the military that are accomplishing these efforts (see Figure 2).

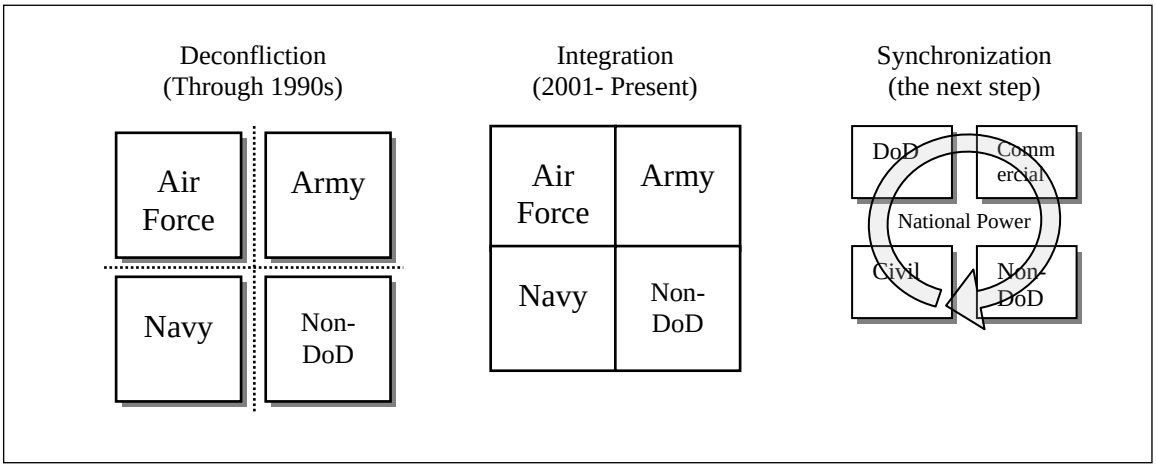

Figure 2. Progression of Space Effects in Operations

[57] Statement by Undersecretary of the Air Force, the Honorable Ronald M. Sega, before the Armed Services Committee United States House of Representatives Subcommittee on Strategic Forces, 16 March 2006.

From its birth, military space has suffered from fragmentation which has only intensified as reliance on space systems grew. According to Lieutenant General Michael Hamel, commander of the Space and Missile Systems Center,

> The enormous organizational, program, and cultural change in military space that occurred from the early 1980s to early 1990s produced divergent communities, fractious relations, and competing visions and directions throughout the Air Force as well as the broader military space community. Systems and operations became both more interdependent and "stovepiped." …The many changes in organizations, programs, culture, and priorities over the past two decades have seriously fragmented the military space capabilities and community. Despite the fact that the Air Force provides the bulk of space expertise and capabilities, one finds serious fragmentation and dilution of authorities and responsibilities among the services, defense agencies, combatant commanders and DoD staffs.[58]

Under Secretary Sega's priorities set a course that will build a strong space community in the future, but only marginally address the fractured nature of current operations. In order to heal the "serious fragmentation and dilution of authorities and responsibilities" necessary to optimize space capabilities in the battlespace a unifying command and control organization is needed that is capable of synchronizing the efforts of space forces globally and within a geographic combatant commander's theater. A unifying command authority will require joint space professionals educated in space power theory and operations, joint doctrine focused on space warfare in addition to space force enhancement, dedicated resources focused on a specific theater of operations, and globally minded resources prepared to provide combatant commander support from the United States. What is absent in the Joint Force Commander's organization is a command and control construct that unifies and translates strategic space priorities to the operational level of war to effectively leverage and employ space power.

[58] Lt. Gen. Michael Hamel, "Building Space Power for the Nation: Air Force Achievements, Challenges, and Opportunities," *Air and Space Power Journal*, xx, no. 2 (Summer 2006): 58.

Summary

Space capabilities have matured to become a focal point for military and civilian operations. Space based resources and systems are the integrating function allowing the military to transform into a leaner, faster, more lethal force. Information dominance drives new developments on the battlefield. The Cold War links have grown into global architectures that touch every aspect of daily operations from strategic decision makers to tactical operators. Sensors, control elements, analysts, and shooters networked together by satellite communications passing data and video enable refined precision and increase the speed of decision cycles. Space superiority is no longer a luxury the United States can take for granted. Space capabilities have become a center of gravity that is both a strength and a weakness. Space systems are no longer a distant wish reserved for superpowers. The proliferation of military and commercial space systems also proliferated the philosophy that any global actor can obtain the asymmetric advantages that space offers. With so many nations participating in the "space race," the asymmetric advantage held by the US is diffusing to other nations. The benefits of satellites have also created critical vulnerabilities that invite exploitation or electronic attack from other nations or actors to deny or disrupt key services.

The strategic environment has changed requiring the United States military to redefine its view towards space operations. As space capabilities became more prevalent in the operational environment, the demand to improve the flow of information from traditional space force enhancement functions also grew. At the same time, the strategic environment changed and new threats to US space operations emerged emphasizing the need for robust planning and execution of space control operations. Defending space

assets and conducting offensive space operations became critical responsibilities that require dedicated space personnel. The first step to enabling this change is to unify the diverging pieces and sub-cultures within the services.

CHAPTER 2

SPACE DOCTRINE—JOINT OR JOINED?

But if we limit our efforts only to applying space technologies to existing modes of war fighting, we have undershot.…It is no different than all the ways our armed forces once found for airpower to support ground operations—and do no more.

Hon. Peter B. Teets
Former Undersecretary of the Air Force and
Director, National Reconnaissance Office

Fragmentation in the military's space community is magnified by its failure to write unifying joint doctrine and organize to maximize capabilities. There is a disconnect between the tactical application and the strategic vision of space systems. Part of the disconnect stems from immature or stovepiped command and control processes built within the absence of mature joint doctrine. This chapter presents a review of Joint Publication 3-14, *Joint Doctrine for Space Operations* as it relates to unity of command and compares it to the growth evident in service doctrine. The chapter will discuss how each of the services have organized and trained to meet individual service needs, despite the universal perspective within the community that "space is inherently joint."[59] The purpose of this chapter is to inform the reader of the independent, overlapping, and sometimes contentious efforts that are hindering joint space integration efforts. The focus on service needs is resulting in greater fragmentation of space forces instead of building synergistic effects.

[59] Lt Gen Frank Clotz, "Space Command and Control: The Lynchpin to Our Success," *High Frontier: The Journal for Space and Missile Professionals* 2, no. 3, (April 2006): 2 also US Army Field Manual 3-14, *Space Support to Army Operations* (May 2005): 1-1.

Current Joint Doctrine for Space Operations

Joint Publication 3-14 provides the baseline for conducting planning and space operations from a global and theater perspective. Since JP 3-14's publication in August 2002 the space community has experienced tremendous change due to a new strategic environment and lessons learned from combat in Afghanistan and Iraq. Unfortunately, JP 3-14 has not kept up with the changes. In an effort to provide current guidance, US Joint Forces Command (USJFCOM) requested formal feedback regarding the document's content from all services and combatant commanders from August to November 2006, but still fell short in identifying a date to begin rewriting and updating the publication.[60] The strategic application of space capabilities, as well as educating readers about military space systems, represents the bulk of the doctrine with little effort devoted to theater integration at the operational and tactical levels of war. Instead of presenting a construct for the seamless integration of both global and theater space command and control, Joint doctrine polarizes the two perspectives implying that command and control of space forces must exist either to support global operations conducted by the Commander of US Strategic Command (CDRUSSTRATCOM) or theater operations supporting a regional theater Combatant Commander (CCDR)[61].

Although no firm construct for integrated global and theater operations is presented, JP 3-14 does introduce the concept of a space authority to help support planning and coordination efforts for a theater Joint Force Commander (JFC).

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[60] Joint Forces Command, *Request for Feedback on JP 3-14 Space Operations 9 Aug 2002(Suspense 13 Nov 2006)*, by Lt Col Floyd McKinney, Joint Doctrine Group, 10 August 2006. One of the significant changes not documented is the merge of US Space Command (USSPACECOM) with US Strategic Command (USSTRACOM) which now serves as the functional combatant commander for space operations. For the purposes of this paper, USSTRATCOM replaces any references to USSPACECOM in the current publication.

[61] This perspective is also supported in Joint Publication 3-30, *Joint Operations*, 17 September 2006. v-4.

Throughout the document and in practice, the position is referred to as the *space authority* or the *coordinating authority,* but the most universally accepted name and what is codified in the most recent updates to other Joint Publications is the *Space Coordinating Authority* (SCA).[62]

According to JP 3-14, the SCA is to serve as the bridge between the global command authority at USSTRATCOM and the theater CCDR. "Coordination of space operations between the staffs of the supported and supporting commanders is normally established through the designation of a space [coordinating] authority by the combatant commander. …The designated space [coordinating] authority will ensure the identification of operational requirements and their inclusion in the appropriate annex."[63] The publication provides a minimal job description for the SCA by stating, "the space [coordinating] authority will coordinate space operations, integrate space capabilities, and have primary responsibility for in-theater joint space operations planning."[64] The main function of the SCA is to gather space requirements across the joint force and then provide a prioritized list of requirements to the Joint Force Commander and to CDRUSSTRATCOM.[65] Since the SCA is not designated as a commander of space forces and no command authority is given, based on the position's title the SCA must leverage coordinating authority to accomplish these planning tasks.[66]

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[62] Joint Publication 3-14, *Joint Space Operations*, 9 August 2002, ix. For the purposes of this paper, Space Coordinating Authority (SCA) replaces any references to the space authority in the current publication.
[63] Ibid., x. The "appropriate annex" refers to the chapter of the theater operations plan (OPLAN) that is most applicable to the space capability being planned. Annex N is for space operations, but space capabilities are also found in several other annexes to include intelligence (B), operations (C), and communications (J) to name a few.
[64] Ibid., ix.
[65] Ibid., III-3.
[66] Commanders exercise command through four authorities: combatant command (COCOM), operational command (OPCON), tactical control (TACON), and support (which also has four designations). Each authority provides different degrees of control over forces, with COCOM giving the greatest and TACON

According to Joint Publication 0-2, *Unified Action Armed Forces (UNAAF),* coordinating authority is "a consultation relationship between commanders, not an authority by which command may be exercised. It is more applicable to planning and similar activities than to operations."[67] Coordinating authority allows a commander to facilitate unity of effort across multiple services, component commanders or force elements. It does not grant command authority, but is best used for planning and consultation. According to Joint Pub 3-14, the Space Coordinating Authority "typically will be the joint force air component commander, joint force land component commander, or joint force maritime component commander…. The JFC considers the mission, nature and duration of the operation, preponderance of space force capabilities, and the command and control capabilities (including reach-back) in selecting the appropriate option."[68] In practice, due to the Air Force maintaining the preponderance of space forces, the Joint Force Air Component Commander (JFACC) is traditionally designated as the SCA.[69] In light of the lack of joint operational command authority and the delegation of authority for planning and coordination falling to components, understanding service perspectives towards integrating space operations will provide additional insight to the struggles in the joint environment.

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providing the narrowest control. Joint doctrine also specifies three additional authorities: administrative control (ADCON), direct liaison authorized (DIRLAUTH), and coordinating authority. None of these "other authorities" grants command authority by which military operations may be directed. The purpose of the additional authorities is to help ensure unity of effort not provide unity of command. See Joint Publication 0-2, *Unified Action Armed Forces (UNAAF),* 10 July 2001, III-3-12.

[67] JP 0-2, *UNAAF*, III-12.

[68] JP 3-14, *Space Operations*, III-3.

[69] Operation IRAQI FREEDOM marked the first time the JFACC was designated as the SCA. In recognition of the Air Force's growing role in space operations it re-designated the JFACC as the Joint Force Air and Space Component Commander. Ironically, the acronym remains JFACC.

Service Perspectives for Space Operations

Knowing the different branches of the military operate in different but overlapping mediums of air, land, and sea, it is no surprise that each service has focused its space operations towards the needs of that specific entity. It is also not surprising there are overlapping needs for space products and effects, but the inherently joint nature of space forces has devolved to services competing for limited resources instead of optimizing forces to meet the needs of all components.

Navy Perspective

Although the navy has been involved in space operations for over 60 years, compared to the other services it remains focused on traditional, strategic level space support functions. The nature of naval operations emphasizes the need for long-haul communications, satellite navigation in a featureless environment, intelligence gathering, and indications and warning. Because these mission areas are so well established and are fully integrated into other operations, the navy does not maintain a separate career field for space operations. Instead it identifies space operations as a sub-specialty code in addition to a primary specialty. One author postulates that, "One sign that the Navy has been mostly ignoring space is that they have not significantly updated their basic space policy guidance since 1993."[70]

The latest navy space policy released 20 May 2005 provides guidance to increase research and technology development as well as give greater emphasis to personnel development in the Navy space community but it doesn't alter the path the Navy has pursed since 1993 despite the policy's mandate that the Navy and Marine Corps "must

[70] Taylor Dinerman, "The US Navy: lost in space?" *The Space Review*, (24 October 2005), Internet, available from http://www.thespacereview.com/article/480/1, accessed 26 December 2006.

maintain their ability to tactically exploit the capabilities provided by space systems."[71] Although these investments will benefit the Navy in the future, there is little change from the 1993 policy that alters how the Navy views space application for the fleet. Space remains only an enabler (primarily for network-centric operations and information dominance) instead of a medium for warfare.[72] Rear Admiral Gerald Beaman, Commander of the Naval Network and Space Operations Command highlights this view of space operations by commenting that if the Navy doesn't protect these networks "then an enemy could interrupt our command and control, force our forces to operate independently, and therefore take from us our greatest advantage…that of our ability to act in a coordinated fashion, anywhere on the globe."[73] Because the Navy maintains an operational level view of space effects, the Marine Corps is looking to the Army and Air Force for tactical space support on land to enhance ground combat operations and to conduct defensive space control to protect its deployed space capabilities.[74]

Army Perspective

The Army's recognition that "space enables virtually everything that it does" is driving the service to incorporate "space operations, space control and space systems into all land operations." [75] The May 2005 update and renaming of Field Manual 100-18 to Field Manual 3-14 *Space Support to Army Operations*, reflects the Army's attempt to

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[71] Chief of Naval Operations, OPNAV INSTRUCTION 5400.43, *Navy Space Policy Instruction*, (5 May 2005).

[72]

[73] RDML Gerald R. Beaman, "Dominance in Space is Dominance in Command and Control," *High Frontier: The Journal for Space and Missile Professionals* 2, no. 3, (April 2006): 15.

[74] In October 2006 Carrier Support Group-8 arrived on station in the Persian Gulf to support Central Command Operations in the region. CSG-8 arrived with the first ever CSG Space Cell who is dedicated to integrating space support into maritime planning and operations. Due to the newness of the organization, the author was unable to collect additional information regarding the results of their efforts. LTC Thomas James, Deputy Director of Space Forces, US Central Command Air Forces, Email to author, 23 September 2006.

[75] LTC Curt Stover, "Space—Serving the Nation's Needs," *Army Space Journal* 4, no.1, (Winter 2005):16-17.

mirror Joint doctrine and joint publications. Due to Joint Pub 3-14's outdated joint guidance, Army space operations remain tightly focused on "contributing to establishing and maintaining space superiority consistent with land warfighting dominance needs" instead of reflecting a more "inherently joint" nature.[76] According to FM 3-14, "Army space operations consist of those activities concerned with controlling and exploiting space to enhance land warfighting. …Army space power is a terrestrial entity and is land warfare centric."[77] Although narrowly focused, this perspective provides an unrivaled ability to determine the tactical space needs of troops on the ground. The focal point for these efforts is to have a "credible 'space-cadre.'"[78]

In December 1997 the Army recognized the need for a core of space professionals with the establishment of the Space Operations Officer career field known as Functional Area 40 (FA40). Since then more than 150 officers have received the career field designation and are integrated throughout the Army at all levels of command.[79] The majority of these officers have focused on the operational to tactical level of war and form the basis of the Army Space Support Teams (ARSST). These teams can deploy within 48 hours and normally augment the space element in corps and division operations (G3) staffs. The ARSST is typically composed of two space operations officers (FA40s), an intelligence analyst, a SATCOM systems operator, a topographic analyst, and an information systems operator-analyst. This team provides the foundation of space support to Army headquarters units and is trained to support planning efforts as well as

[76] Field Manual 3-14, *Space Support to Army Operations* (18 May 2005): 1-1.
[77] Ibid., 1-9.
[78] Stover, "Space—Serving the Nation's Needs," *Army Space Journal*, (Winter 2005):17.
[79] LTG Larry J. Dodgen, "Leveraging Space to Support the Changing Paradigm," *High Frontier: the Journal for Space and Missile Professionals* 1, no. 4, (Winter 2005): 10.

operations in SATCOM, precision navigation and timing, environmental monitoring, intelligence, missile warning, space control, and theater tailored space information.

In August 2004, Space Support Elements (SSEs) were created to directly support the Army's Task Force Modularity concept and to further extend the integration of space operations to lower levels of operations. These SSEs are designed to deploy with division and brigade staffs and act as the direct conduit for pushing space products and capabilities to the tactical level.[80] During Mission Rehearsal Exercises with the Third Infantry Division (3ID) from June to October 2004 and then later deployment to Baghdad, Iraq in February 2005 the inaugural SSE integrated its support into several operations efforts, to include:

1. Personnel recovery missions (including downed pilots and combat search and rescue)
2. Identifying how combat imagery requirements could best be satisfied
3. Analyzed space weather effects on satellite communications
4. Supported blue force tracking capabilities embedded in the 3ID
5. Requested support from stateside organizations for spectral imagery
6. Produced three dimensional and topographic maps for terrain familiarization
7. Provided GPS navigational accuracy predictions for the employment of GPS aided weapons
8. Integrated overhead non-imaging infrared collectors into the intelligence collection plan[81]

The support proved effective at the brigade level, but deconfliction or synchronization of activities with other units or components was not assessed as part of the exercise.

As the final element of coordinating space efforts in theater, Army doctrine recognizes the need for a Space Coordinating Authority. FM 3-14 does not add to the

[80] LTC Richard Dow, "The Army's First Space Support Element (SSE): Manned, Trained, Equipped and Combat Ready!," *The Army Space Journal* 4, no. 1, (Winter 2005): 24.
[81] Ibid., 25. For a more detailed list of task requirements as defined in Army doctrine, see Field Manual 3-14, *Space Support to Army Operations* (18 May 2005): E-1.

body of critical thought for roles and responsibilities of this position, it simply echoes JP 3-14 and identifies the possibility that the Joint Force Land Component Commander could be designated as the SCA.[82]

The establishment of the FA40 career field and deployment of both ARSSTs and SSEs, reveals the Army's commitment to the changing demands of warfare and the growing requirements to integrate space effects into tactical operations. As the military's largest user of space products and effects, the Army recognizes that it is dependant on the Air Force as the executive agent for space to operate many of the systems and conduct most of the operations upon which the Army depends. But a common complaint levied against the Air Force is that "many [people] in the Air Force's space and acquisition programs have never worked the tactical Air Force. Only after extensive in-theater service in the Air Operations Centers do the space forces gain a sense of tactical understanding."[83] The Joint Air Operations Center (JAOC) plays a central role in theater space integration for the Air Force—in many ways advancing integration and in some ways hindering space's full application.

Air Force Perspective

More than any other service or joint body, the Air Force has pushed the development of space systems, doctrine, procedures, and education. As the Department of Defense's executive agent for space, the Air Force controls the bulk of the military budget and bears the greatest responsibility to advance military space operations.[84]

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[82] Field Manual 3-14, *Space Support to Army Operations* (18 May 2005): 3-8.
[83] Miller Belmont, "Time for a New Space Force? Not So Fast!," *The Army Space Journal* 4, no. 1, (Winter 2005): 23.
[84] Executive Agent: A term used to indicate a delegation of authority by the Secretary of Defense to a subordinate to act on the Secretary's behalf. An executive agent may be limited to providing only administration and support or coordinating common functions or it may be delegated authority, direction,

According to the General Accounting Office, "the Air Force is the primary procurer and operator of space systems. For fiscal years 2002 through 2007, the Air Force is expected to spend about 86 percent of the total programmed space funding of about $165 billion, whereas the Navy, the Army, and other Defense agencies are expected to spend about 8 percent, 3 percent, and 3 percent, respectively."[85] Even though the Air Force is charged to lead the joint community, its efforts to provide unifying direction often remain within service channels. At the strategic level, the Air Force provides unrivaled support to joint operations, but at the operational and tactical levels, it remains stovepiped operating in an air-centric perspective. Expounding upon the findings of the *Commission to Assess United States National Security Space Management and Organization*, known as the Space Commission, one critic stated that "as long as the senior space operator remains part of the JFACC's staff, the focus for the employment of space forces will not likely shift away from providing support to air operations."[86] At the heart of integrating air and space operations into the Joint Force Commander's campaign is the Joint Air Operations Center (JAOC).[87] Understanding how space operations fit into the functions of the

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and control over specified resources for specified purposes. Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 12 April 2001 (as amended through 16 October 2006): 192.

[85] U.S. General Accounting Office, "Report to the Secretary of Defense. Military Space Operations: Planning, Funding, and Acquisition Challenges Facing Efforts to Strengthen Space Control," (Washington D.C., September 2002), 3, GAO-02-738.

[86] Maj Samuel L. McNeil, "Proposed Tenets of Space Power: Six Enduring Truths," *Air and Space Power Journal* xviii, no. 2, (Summer 2004):78.

[87] The Joint Air Operations Center is the joint doctrine term for the command and control center that plans and conducts air and space operations on behalf of the Joint Force Air Component Commander (JFACC). The JFACC is charged with supporting the Joint Force Commander's campaign objectives using air and space power. When working with allies in a coalition environment, the JAOC is often called a Combined Air Operations Center (CAOC). When referred to in Air Force Doctrine the command center is the Air and Space Operations Center but the acronym remains AOC. Although each term refers to a slightly different environment, for the purposes of this study the terms are synonymous and will be consolidated to JAOC.

JAOC and the role of the Director of Space Forces (DIRSPACEFOR) provides the foundation for Air Force space integration.[88]

Space in the JAOC

Born from the experience in Operation Desert Storm, the JAOC remains the focal point for planning, executing and assessing air operations. As the Air Force has assumed new missions over the years, each has been integrated into the JAOC structure and operations. Designated a weapon system by the Air Force its purpose is to provide "operational-level C2 [command and control] of air and space forces. The [JAOC] includes personnel and equipment to ensure the effective conduct of air and space operations."[89] The current construct of the JAOC includes a "director, five divisions (Strategy; Combat Plans; Combat Operations; Intelligence, Surveillance, and Reconnaissance; and Air Mobility), and multiple support and specialty teams."[90] Figure 3 depicts a representation of the JAOC's structure and identifies space as a supporting element integrated across all of the divisions. Total manpower in the JAOC ranges between 300 and 2000 personnel depending on combat needs. Space personnel representation remains very limited with four to eight Air Force officers and non-commissioned officers typically spread across the Strategy Division, Combat Operations, and Combat Plans. Future discussion will show this number is inadequate for robust

[88] This study presents the Air Force space perspective as it relates to the joint environment and to show its strengths and weaknesses supporting the joint campaign. The foundation of thought for this subject is the direct result of the author's experience working in JAOCs for US Pacific Command, US Central Command, US Forces Korea, and US Strategic Command. The author is thankful to Major Mark Schuler for developing a similar but more thorough discussion of space operations in the AOC from an Air Force service perspective and referencing work accomplished by this author. Maj Schuler draws the same conclusion that space personnel in the AOC must be reorganized to maximize their effectiveness. See Major Mark Schuler, "Building a True Air and Space Operations Center: Are We There Yet?," (School of Advanced Air and Space Studies, Maxwell AFB, 2006).

[89] Air Force Instruction (AFI) 13-1AOC Volume 3, *Operational Procedures—Air and Space Operations Center*, 1 August 2005: 5.

[90] Ibid., 9.

space control planning and operations. Current manning does not provide the right joint force mixture for effective synchronization of space effects.

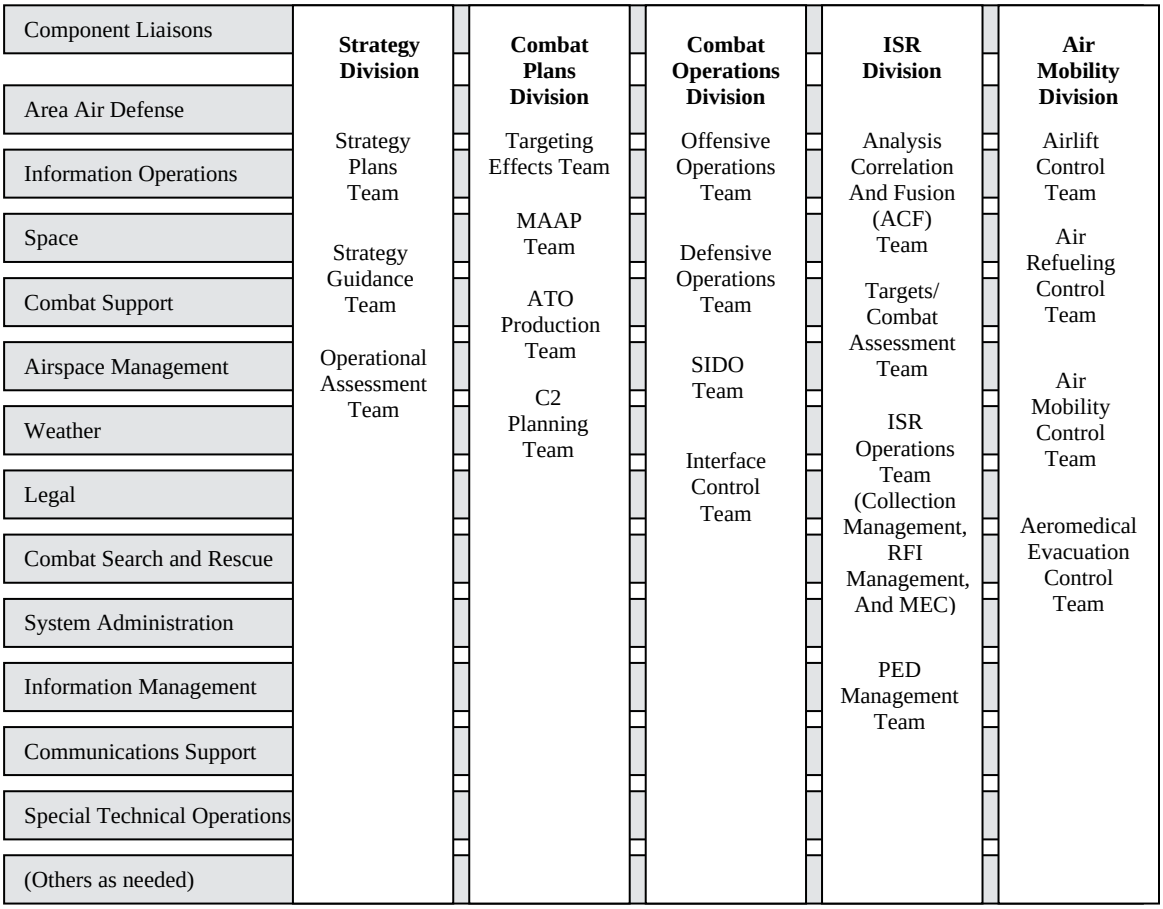

Figure 3, JAOC Organization.[91]

Traditionally, these space personnel have provided force enhancement effects to air operations. These support operations seek "to improve the effectiveness of military forces as well as support other intelligence, civil, and commercial users."[92] The most common support functions include:

1. Early warning of theater ballistic missile attacks
2. Space support to downed aircrew and personnel recovery missions

[91] AFI 13-1AOC Volume 3, *Operational Procedures—Air and Space Operations Center*, 1 August 2005: 10.
[92] Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 12 April 2001 (as amended through 16 October 2006): 495.

3. Knowledge of space based intelligence, surveillance and reconnaissance capabilities
4. Analyzing space weather effects on satellite communications
5. Coordinating support from stateside organizations for continental US (CONUS) based products and capabilities
6. Integrating overhead non-imaging infrared collectors into the intelligence collection plan[93]

As a point of reference, the reader should recall the list of support products provided by the Army SSE deployed with divisions and brigades is very similar. In many cases, the actual products are duplicate efforts covering the same area, information or timeframe. In some cases, the end result is additional strain on limited, shared national resources.

Recognizing the strategic environment for space operations is rapidly changing with growing threats to friendly space operations and adversaries seeking the same advantages from space that the US military enjoys, the Air Force has devoted significant resources to developing and integrating space superiority operations into the JAOC. The publication of Air Force Doctrine Document 2-2, *Space Operations* and its supporting document Air Force Doctrine Document 2-2.1, *Counterspace Operations* provide the doctrinal foundation for the three pillars of space control: space situational awareness (SSA), offensive counter space (OCS) and defensive counter space (DCS).[94] These three areas provide the eyes, swords and shields to conduct space warfare.[95] Air Force doctrine defines space control as those "operations to ensure freedom of action in space

[93] AFI 13-1AOC Volume 3, *Operational Procedures—Air and Space Operations Center,* 1 August 2005: 62.
[94] The terms *offensive counterspace* and *defensive counterspace* remain uniquely Air Force terms that mirror offensive counterair and defensive counterair. US Strategic Command, the combatant command responsible for space operations has chosen to adopt the terms *Offensive Space Control* (OSC) and *Defensive Space Control* (DSC) which is also a departure from Joint Publication 3-14 that uses *space control negation, prevention, protection, and surveillance.* The intention of this note is to show that even in terminology the military space community is fragmented and less than unified.
[95] Lt Col Mark E. Harter, "Ten Propositions Regarding Space Power: The Dawn of a Space Force," *Air and Space Power Journal* xx, no. 2, (Summer 2006): 72.

for the United States and its allies and, when directed, deny an adversary freedom of action in space."[96] The development of the Air Force Counter Communication System (CCS)[97] and the Army Space Control and Electronic Warfare Detachment (SEWD)[98] both able to jam satellite communications, theater commanders have new capabilities to conduct a true space war in addition to destroying ground support infrastructure such as satellite uplink stations. Offensive operations have garnered the most attention in operations and exercises since OIF, but OCS only represents a small piece of the equation. The 2005 deployment of Silent Sentry in support of US Central Command operations and the ongoing development of the Rapid Attack, Interference, Detection, and Reporting System (RAIDRS) highlight the growing need for protecting US space access and the need to relinquish the old mindset that satellite access can be taken for granted and unchallenged.

Adding CCS, SEWD, and Silent Sentry operations to the JAOC has significant implications for JAOC organization and personnel. In the current Air Force doctrine construct, the same personnel that concentrated on space force enhancement must now add the ability to coordinate with multiple stateside support organizations and theater components for space control requirements and fire coordination. Additionally, the JAOC must have the expertise and equipment to plan, task, execute, and assess space operations in support of the joint force.

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[96] Air Force Doctrine Document 2-2.1, *Counterspace Operations*, 2 August 2004: 54. This definition closely mirrors the joint definition.

[97] In September 2004, the Air Force declared operational the Counter Communication System (CCS) which is a ground-based, deployable system designed to disrupt satellite-based communications using temporary and reversible methods.

[98] LTC Scott Netherland, "Space Control and Electronic Warfare Detachment (Force Structure)," *Army Space Journal* (Summer 2002): 27. SEWD is an Army ground suite of equipment with a similar mission and capabilities to the Air Force CCS.

During large exercises and times of major combat operations the Air Force deploys additional officers, primarily graduates of the US Air Force Weapons School known as Space Weapons Officers, to augment operations. Although highly trained in theater integration of space operations, the training emphasizes integration with air operations and coordination with the Air Tasking Cycle (see Figure 4).[99] "Their primary function [is] the optimizing of space support for air operations and ensuring that the JFACC has experts who can see to it that airpower uses space to its fullest advantage."[100] Land and maritime support is accomplished only indirectly through the perspective of air operations. Compounding the problem is that training in preparation for deployment to theater JAOCs focuses only on major combat operations and often overlooks space support to humanitarian operations such as Hurricane Katrina relief, and counter insurgency operations such as Global War on Terrorism efforts in Iraq. All of these scenarios require space operations support outside of the traditional gain and maintain air and space superiority paradigm.

[99] Air Force Space Command, *AFSPC Deployments AEF Cycle 5, Rotation 9/10, Lessons Learned, AFSPC/A9L Post Deployment Lessons Learned Interview, 8 August 2006*, (AFSPC/A9L, 9 August 2006): 16. Also, as a graduate of the US Air Force Weapons School, the author has first hand knowledge of the curriculum and requirements placed on SWOs in follow-on assignments.
[100] Maj Samuel L. McNiel, "Proposed Tenets of Space Power: Six Enduring Truths," *Air and Space Power Journal*, xviii, no. 2, (summer 2004): 78.

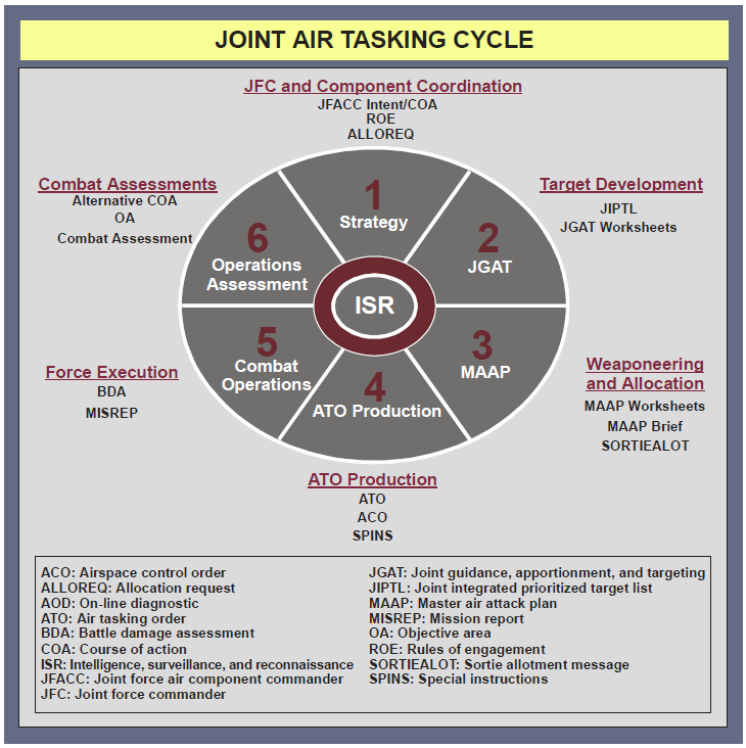

Figure 4, Joint Air Tasking Cycle[101]

In continuing efforts to conduct a unified air and space effort, the 2002 version of Air Force Instruction 13-1 governing the Air and Space Operations Center removed the space specialty team and distributed the space personnel to work for and report to the various divisions in the JAOC. According to Major Schuler,

> …it appears the Space Specialty Team was a seam and the Air Force vision was a "seamless integrated military organization." In OIF, the resulting structure negatively affected coordination between space personnel in the CAOC and left a "leaderless tribe" striving to make things work, but without the optimal focus of effort. Additionally, the lack of a specialty team left the CFACC's new SCA responsibilities without a team to execute them. While the SCA CONOPS directed the other components to route all theater requests for space effects through the CAOC "space cell," there was no overall cell or team structure covering the space personnel tasked to execute this CONOPS for the CFACC.[102]

[101] Joint Pub 3-30, *Command and Control for Joint Air Operations*, (5 June 2003): III-23.
[102] Major Mark Schuler, "Building a True Air and Space Operations Center: Are We There Yet?," (School of Advanced Air and Space Studies, Maxwell AFB, 2006): 34.

The organization of space personnel in the JAOC remains mostly unchanged, despite the increased responsibilities of the JFACC for space operations and coordination.

Since the JFACC's designation as the SCA in Operation Iraqi Freedom, the Air Force has continued to define and refine the SCA's responsibilities. In the most recent Air Force doctrine to address space issues, Air Force Doctrine Document 2, *Operations and Organizations* defines seven functions for the job:

1. Determine, deconflict, and prioritize military space requirements for the [Joint Task Force]
2. Recommend appropriate command relationships for space to the JFC
3. Help facilitate space target nomination
4. Maintain space situational awareness
5. Request space inputs from JTF staff and components during planning
6. Ensure optimum interoperability of space assets with coalition forces
7. Recommend JTF military space requirement priorities to JFC[103]

Despite the Air Force's lead to define SCA responsibilities, there exists significant disagreement among the services over how much control the SCA should exercise, possibly due to a lack of clear joint direction. In an effort to fill the hole, Joint Publication 3-0, *Joint Operations* published 17 September 2006 states,

> The SCA is responsible for coordinating and integrating space capabilities in the operational area, and has primary responsibility for joint space operations planning, to include ascertaining space requirements within the joint force. …The processes for articulating requirements for space force enhancement products are established, are specifically tailored to the functional area they support, and result in prioritized requirements. Thus the SCA typically has no role in prioritizing the day to day space force enhancement requirements of the joint force.[104]

This latest guidance implies some see the Air Force as attempting to increase its control over all space forces in the theater and exercise unneeded authority over communications

[103] AFDD 2, *Operations and Organization*, 27 June 2006: 62-63.
[104] Joint Publication 3-0, *Joint Operations*, 17 September 2006: III-7.

and ISR support. While some well established processes may not require SCA intervention, continuous advances in applying existing space force enhancement products to new tactical situations may require prioritization and unity of effort to ensure requirements of all elements of the joint force are met. Ongoing conflict over roles and authorities of the SCA may originate from the creation of the Director of Space Forces.

The Director of Space Forces

To support the additional breadth of space operations in the JAOC, the Air Force created the Director of Space Forces (DIRSPACEFOR) to act as the senior space officer supporting theater space planning and operations. Very few positions in the JAOC or on the Joint Force Air Component Commander (JFACC) staff are more of a lightning rod for controversy than the DIRSPACEFOR.

From its inception in 2002 as the Senior Space Officer (SSO), the position was created to act as an advisor to the Commander of Air Force Forces (COMAFFOR)[105]. In 2004 the Air Force renamed the position DIRSPACEFOR. Also from the beginning, how this position interacts with the rest of the organization was contentious. Brigadier General Larry James, who served as the first SSO in OIF, commented that "a great deal of time was spent hammering out roles and responsibilities between the SSO, the senior staff, and the space personnel located throughout the CAOC."[106] The combination of permanent, embedded space weapons officers serving as the de facto JAOC leadership for space and the lack of a space cell in the JAOC requiring space personnel to work for

[105] The COMAFOR is the commander of US Air Force forces supporting a Combatant Commander (CCDR). Often, the CCDR will identify the COMAFFOR as the JFACC to support a Joint Task Force (JTF) or other joint military operations. The COMAFFOR represents the Air Force service requirements to organize, train and equip forces for operations and the JFACC is the commander executing those forces in support of the Joint Force Commander.

[106] Brig Gen Larry D. James, "Brining Space to the Fight: The Senior Space officer in Operation IRAQI FREEDOM," *High Frontier: The Journal for Space and Missile Professionals* 1, no. 4, (Winter 2005): 14.

separate division chiefs added to the friction of establishing a new position for a Colonel or Brigadier General that would deploy only during contingencies or exercises. Who will work for this person and where will the position reside in the organization? Neither question has been answered effectively nor uniformly across different combatant commands.[107]

The title Director of Space Forces adds to the confusion because the position was created to act only as an advisor and not as a director. The most recent Air Force doctrine defines the following responsibilities for the position:

> The DIRSPACEFOR serves as the senior space advisor to the JFACC. The DIRSPACEFOR, an Air Force space officer, coordinates, integrates, and staffs activities to tailor space support to the JFACC. In addition, when the JFACC is designated as SCA, the DIRSPACEFOR will work the day-to-day SCA activities on behalf of the JFACC. …The DIRSPACFOR is part of the JFACC's special staff. …specific responsibilities include:
>
> 1. Provide senior space perspective for strategy and daily guidance development, target selection, force enhancement to terrestrial operations, and special technical operations (STO) activities relating to space operations.
> 2. Facilitate AFSPC, USSTRATCOM, and national support to the JFC.
> 3. Provide assistance to the JFACC in determining and achieving military space requirements.
> 4. Assist regional AOC staff in developing and staffing space related operational requirements and policy matters.
> 5. Recommend appropriate command relationships for space to the JFACC.[108]

This definition is also reflected in the older, 2004 AFDD 2-2.1, *Counterspace Operations*, with the notable removal of the responsibility to "direct and monitor, on behalf of the COMAFFOR/JFACC, space forces and capabilities assigned or attached to

[107] Randy Hugenroth, , "Joint Space Coordination Task Final Report," USSTRATCOM, 28 February 2006, and Capt Merna H. H. Hsu, "Improving Air and Space Integration in the Air Operations Center," Nellis AFB, NV: USAF Weapons School, 13 December 2003.
[108] AFDD 2, *Operations and Organization*, 27 June 2006: 63.

the COMAFFOR/JFACC, including space-related special technical operations; includes space forces made available for tasking with specification of [tactical control] to the COMAFFOR/JFACC."[109] The change reflects the strong sentiment of proponents of the current JAOC structure (space personnel integrated throughout the organization) to limit the authorities of the position because it falls outside of the normal operational chain of command. The change also adds to the conflict of what are the appropriate authorities and duties of a senior level advisor. Also significant in the duty description is the clear identification that the DIRSPACEFOR is an Air Force officer, in an Air Force service position working "the day-to-day responsibilities of the SCA" who, by definition is focused on the joint force. Col Michael Carey, a DIRSPACFOR assigned to the Combined Forces Air Component Commander (CFACC) at the CAOC at Al Udeid AB, Qatar from October 2004 to February 2005 notes the significant limitations imposed on the position, "…as an Air Force officer in an Air Force service billet, there is no inherent or implied authority over joint forces. Additionally, since the DIRSPACEFOR serves as an advisor to the CFACC, has no directive authority over the assigned Air Force space forces, to include space personnel assigned to the Operations Division [and other divisions] within the CAOC. …The fact that I was seen as an Air Force advisor only to some created friction and detracted from timely coordination on some space issues which were relevant to accomplishing objectives set forth by the supported commander…Multi-National Forces—Iraq."[110] Until a general officer from the space career field is designated as the Joint Force Air Component Commander controlling air and space

[109] AFDD 2-2.1, *Counterspace Operations*, 2 August 2004: 14.
[110] Col Michael J. Carey, "Integrating Space Capabilities in Support of the USCENTCOM Theater of War: A Challenge for the DIRSPACEFOR," *High Frontier: The Journal for Space and Missile Professionals* 1, no. 4, (Winter 2005): 18.

operations, there will always be the tendency for the SCA to rely heavily on the advice and direction given by the DIRSPACEFOR. Although the responsibilities of the JFACC and SCA overlap, there is a difference that must be identified.

JFACC and SCA: Similar, but Different

The JFACC is given the command authority and responsibility to ensure space effects are integrated and executed within the JFC's campaign plan to gain and maintain air and space superiority. Along with the mission of air and space superiority comes the specification of supported commander for that mission. Joint Publication 3-30, *Command and Control for Joint Air Operations,* outlines JFACC duties to include: "planning, coordinating, and monitoring joint air operations, and the allocation and tasking of joint air operations forces based on the JFC's concept of operations"[111] The primary organization to support the JFACC is the 2000 person JAOC. The JFACC exercises command authority over those space force enhancement and space control assets that fit neatly into the Air Tasking Order process. The DIRSPACEFOR augments this process by providing senior officer perspective and advice on the best employment of space forces commanded by the JFACC.

Normally, the designation of JFACC also carries the additional responsibilities of Area Air Defense Commander, Airspace Control Authority, Collection Management Authority, Jamming Control Authority, Combat Search and Rescue Authority, and Space Coordinating Authority. Each authority, with the distinct exception of SCA, carries commander responsibilities and authorities to deconflict, prioritize or task forces to accomplish the assigned mission. Space Coordination Authority relies on a function best suited to staffing for ensuring unity of effort across theater, global, joint, and interagency

[111] Joint Publication 3-30, *Command and Control for Joint Air Operations,* 5 June 2003: ix.

space forces. Recognizing this is a significant challenge that requires space expertise, the traditional path taken by JFACCs with SCA is to delegate this responsibility to the DIRSPACEFOR to act on behalf of the JFACC.[112]

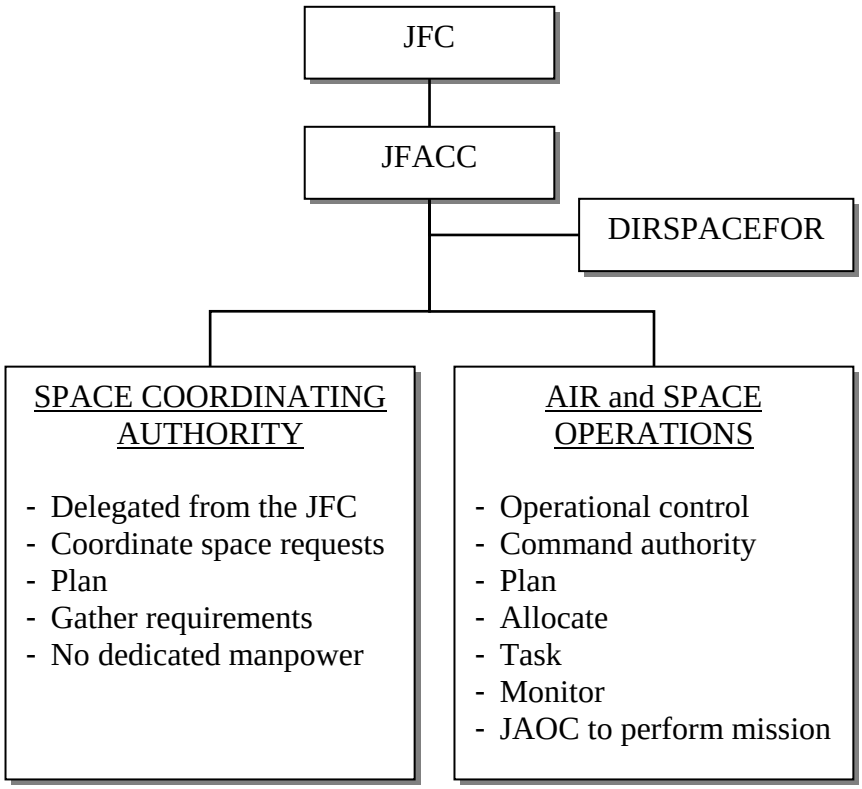

Figure 5. JFACC responsibilities for space operations

The rank, position, and space expertise of the DIRSPACEFOR combined with the need for coordinated space efforts add to the confusion and blurring of responsibilities for joint command and control, joint and interagency coordination, and functional area service advisor. Compounding the confusion is the lack of a space staff or DIRSPACEFOR support element to help with either advisor responsibilities or SCA coordination tasks. Consequently, space personnel embedded in the JAOC divisions are asked to support

[112] As previously discussed, this perspective is codified in Air Force doctrine. To date, only the JFACC has been designated as the SCA in operations and exercises. The DIRSPACEFOR may not have this responsibility if a different component commander is designated SCA.

conveying the perception the DIRSPACEFOR is acting as a division chief or that all space coordination must be filtered through the JAOC.

JAOC Organization: Running out of Space

Despite significant advances in space control and tactical application of space effects, the JAOC structure remains unchanged since 2002 and is not well suited for execution of either the JFACC's command authorities for space superiority or the SCAs responsibility to coordinate space requirements and effects across the joint force. Three primary reasons hinder the current organization: confusion regarding how the DIRSPACEFOR fits into the JAOC organization and the joint force at large; the lack of a JAOC organization dedicated to support SCA and space superiority responsibilities; and the improper tasking of space personnel, which may result in missed opportunities to optimize space effects or enhance joint operations.[113]

The first reason the organization lacks synergy is the unclear relationship of the DIRSPACEFOR to other space officers in the JAOC divisions and the joint force. The challenges with the DIRSPACEFOR in the JAOC were previously discussed. But worth noting is the recognition by the former CENTCOM CFACC, Lt Gen Walter Buchanan, of the need for a joint position to execute SCA duties. The addition of an Army FA-40 as the Deputy DIRSPACEFOR helped, but the quickest solution was to designate Col Carey as the Joint DIRSPACEFOR with a small staff of four people.[114] The change enabled two very small but critical steps: it gave credibility to the DIRSPACEFOR in the joint community and helped focus the efforts of the position on the requirements of the other

[113] The observation comes from the authors experience while deployed to JAOCs for major exercises and operations. Additionally, Major Schuler presents similar observations in his work, *Building a True Air and Space Operations Center: Are We There Yet?*.

[114] Carey, "Integrating Space Capabilities in Support of the USCENTCOM Theater of War," 18. Efforts to make this a permanent change were not successful and did not continue after Col Carey re-deployed.

services outside of the JAOC and it created a core of dedicated space professionals with a theater wide perspective beyond integrating into air operations.

The DIRSPACEFOR's small staff was the first step to rectify the second major issue of a lack of a dedicated space organization in the JAOC. The staff of four people reported directly to the DIRSPACEFOR and was to focus on coordination across the joint force in support of the SCA. In addition to the small staff, a small pool of space control expertise was created to augment the embedded space personnel who were focused on space force enhancement. US Central Command Air Forces (USCENTAF) has continued this and designated it the Joint Space Integration Cell and the Space Superiority Cell "tasked to perform mission area analysis and draft [courses of action] to develop relevant theater space-related situational awareness, protect his critical satellite communication links, and if appropriate and authorized deny the same to an adversary."[115] Since offensive counterspace is relatively well known and understood, the true focus of the space superiority cell was defensive counterspace and operation of Silent Sentry. A limitation of both cells is that neither fits into the JAOC core structure which resulted in their assignment to the DIRSPACEFOR as part of the CFACC's special staff.

These two cells have not been adopted by commanders in other theaters. Many of the other JAOCs have not had to withstand the stresses and friction of actual combat; therefore, they have not seen the need to radically change from established Air Force doctrine. A February 2006 study commissioned by USSTRATCOM commented, "There is a different space organizational construct in each geographic theater. This causes difficulty in determining where one should go to request or provide information and

[115] Ibid.

support. The Air Force, tasked with organizing, training, and equipping forces, needs a baseline to support the combatant commanders."[116]

The final hindrance to effective space operations in the JAOC is the improper tasking of space personnel with duties that may only be distantly related to space operations or effects. The lack of an organization focused on accomplishing space specific requirements often leads to space offices torn between tasks from assigned division chiefs and the need to push space integration. The absence of a senior space officer with command authority over space officers compounds the issue resulting in persuasion and personalities to keep space officers focused on space tasks. LTC Thomas James, Deputy DIRSPACEFOR for CENTAF noted in October 2006, "once they leave the DIRSPACEFOR's control, their focus on space will become diluted, working on non-space products. This is common in all military organizations in theater… a body of space folks needs to be 'protected' by the DIRSPACEFOR to focus on space integration."[117] The author witnessed this throughout the CENTCOM joint operations area from September 2005 to February 2006. Officers were often tasked to work other projects not relating to space such as communications problems with A-10 aircraft in Afghanistan, Joint Intelligence Operations Center watch officer for USCENTCOM, and Operation Enduring Freedom strategy planner instead of developing space strategy. In each of these cases, the author as a member of the Joint Space Integration Cell working for the DIRSPACEFOR filled the gap to accomplish needed space planning and coordination. The end result of siphoning off space officers is not space integration but assimilation.

[116] Randy Hugenroth, "Joint Space Coordination Task Final Report," Booz Allen Hamilton Inc. support to USSTRATCOM J5, 28 February 2006, 10.
[117] LTC Thomas James, USCENTAF Deputy DIRSPACEFOR, email to the author, 2 October 2006.

Instead of standing out for what space brings to the fight, Air Force officers have blended into the rest of the air campaign effort.

Summary

The advances of space integration within the last five years have greatly benefited joint forces. As changes occurred, Army and Air Force doctrine and procedures were updated to reflect the new environment. Unfortunately, little unity exists across the joint space community. The current construct for employing space personnel and capabilities is designed to support service unique solutions for each Component Commander. The Army maintains a very tactical "space to mud" perspective, the Air Force has mostly an operational perspective focused on support to air operations and the Marines and Navy see space as a support function and enabler. The JAOC is in the best position to integrate and synchronize space effects across the joint operations area, but its current manning construct forces a very air centric perspective and misses the opportunity to optimize space effects for the other component commanders. Both joint and service doctrine recognizes the necessity of a Space Coordinating Authority to coordinate space requirements across all component commanders but it does not provide sufficient joint authority to effectively execute the SCA role. Consequently, the JFACC has attempted to combine the command authority to conduct space superiority with SCA coordination responsibilities resulting in sub-optimal fulfillment of both. A new command and control and personnel construct is needed to ensure all components can leverage the benefits of space effects as well as optimize how those effects are produced.

CHAPTER 3

SYNCHRONIZING JOINT SPACE FORCES

Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after the changes occur.

Gulio Douhet

Space operations supporting the joint force commander have grown increasingly complex with an ubiquitous presence interwoven in nearly every aspect of military operations. The addition of the Space Coordinating Authority (SCA) working on behalf of the Joint Forces Commander, the Director of Space Forces (DIRSPACEFOR) as an Air Force advisor to the Joint Force Air Component Commander (JFACC), the integration of Army Space Support Teams (ARSST) and Space Support Elements (SSE) from corps to brigade level, and Navy and Marine Corps efforts to leverage Air Force and Army experience for naval operations has created a diverse community within the military that is connected in purpose but lacks the ability to optimize its efforts. The current organization of space personnel in a theater of operations is focused on meeting individual component commander needs and misses opportunities to maximize efforts and effects across the joint force. This chapter presents the recommendation that a Joint Space Synchronization Authority (JSSA) with a tailored staff of joint space professionals will maximize the degree to which requirements for space capabilities from Joint Force Component Commanders are optimized for operations. The chapter begins with a discussion of terminology for optimizing effects as it is currently used by United States Special Operations Command (USSOCOM) in the Global War on Terrorism (GWOT). The terminology is then applied to show how a Joint Space Synchronization Authority

could be more effective than the Space Coordination Authority. Finally, the chapter will present a possible organizational construct to support the JSSA and the growing mission of space superiority.

Defining Authority: Words Matter

Unless there are significant changes in United States law and the Department of Defense, no single geographic or regional Joint Force Commander will have consolidated control of space power in the near future. Consequently, the JFC must rely on an additional authority to achieve unity of effort. Currently in joint doctrine that is the Space Coordinating Authority. But as discussed in Chapter 3 the SCA is most applicable to planning or staffing functions and lacks the authority to unify theater space operations. According to one space weapons officer, "the JFC should use a stronger authority than the SCA to compel agreement with space superiority. Lack of deliberate command authority…could jeopardize the JFC's ability to influence space operations and freedom of action in space."[118] The military space community is not the only entity facing the challenge of unifying diverse and sometimes fragmented operations.

Synchronizing the Global War on Terror

In the Unified Command Plan of 2004 the President expanded USSOCOM's role to become the "lead commander for planning, synchronizing, and as directed executing global operations against terrorist networks in coordination with other combatant commanders."[119] The key to achieving this effort was redefining the word *synchronize.*

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[118] Maj Tyler M. Evans, *Space Coordinating Authority: Information Services from Space,* ed. Lt Col Kendall K. Brown, *Space Power Integration: Perspectives from Space Weapons Officers* (Maxwell AFB, AL: Air University Press, 2006), 21.
[119] *Unified Command Plan 5 May 2006,* (Washington D.C.: 2006), 11

According to Joint Publication 1-02, *synchronize* allows USSOCOM to arrange "military actions in time, space, and purpose to produce maximum relative combat power at a decisive place and time."[120] Although joint and service doctrine is replete with this term, it did not carry the weight nor connotation necessary to lead GWOT planning and execution efforts. According to Lieutenant General Daily, USSOCOM Chief of Special Operations, "the Secretary of Defense was lacking an integrator and his vision was to change the definition of synchronize. *Synchronize* was a compromise word. [The] COCOMs wanted *coordinate* but SecDef wanted his lead agent to have more authority and chose *synchronize*."[121] As discussed in Chapter 3, *coordinate* is best suited for planning or staffing efforts but does not include any authority to compel action. Contrary to that definition, *synchronize* carries the authority to compel action (see Table 1). In addition to calling a meeting or initiating a planning conference, USSOCOM can compel an agreement from the participants.

Table 1. Definitions Commonly Associated with Commanders' Authorities[122]

	SYNCHRONIZE	*ORCHESTRATE*	*COORDINATE*
Definition	Arrangement of actions in time, space, and purpose to produce the maximum or best effect	To arrange or control the elements of, as to achieve a desired overall effect[123]	A consultation relationship for specific functions or activities
Associated levels of authority	Full authority to compel action	Limited authority to compel action	No authority to compel agreement nor exercise command

[120] Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 12 April 2001 (as amended through 16 October 2006): 522.
[121] LTG Daily, USSOCOM Chief of Special Operations, interview with author, 11 October 2006.
[122] Adapted from: Todd Bolger, *USSOCOM GWOT Plans & Process to Support the GWOT,* Joint Special Operations University, (n.d.), slide 6. (SECRET//NOFORN)
[123] Dictionary.com. *The American Heritage® Dictionary of the English Language, Fourth Edition*. Houghton Mifflin Company, 2004. http://dictionary.reference.com/browse/orchestrate (accessed: January 05, 2007).

With this authority, USSOCOM leads the development of the global campaign plan for the war on terror which serves as the umbrella plan into which each of the regional combatant commanders are integrating their plans. With this system, USSOCOM maintains a broader, global perspective of military action for the war on terror and each of the regional commanders is responsible for conducting specific planning and operations within their regions leveraging their expertise. In this role, USSOCOM's specific responsibilities include:

1. Integrating DoD strategy into GWOT plans and establishing intelligence priorities against terrorist networks.
2. Prioritizing and synchronizing security cooperation activities, deployments, and capabilities in campaigns against terrorist networks
3. Exercising command and control of [counter terrorism] operations, as directed.
4. Creating, implementing and directing global operational preparation of the environment.[124]

When conflicts over resources occur, if operations affect multiple regional commanders, or if synergy can be gained by combining multiple operations or forces, the synchronization authority vested in USSOCOM is available to ensure optimization of the mission even if significant compromise is required. The next step is to apply this same model to the space community.

Synchronizing Space Forces

Joint and Service doctrine recognize the need to synchronize space operations, but doctrine has codified a weak position that is not empowered with the right authorities to execute the assigned responsibilities. Army Field Manual 3-14, *Space Support to Army Operations*, most clearly summarizes the space community's view stating, "Space operations by their nature, are joint operations. Each Service component contributes to

[124] Joint Staff, briefing, "The National Military Strategic Plan for the War on Terrorism (NMSP-WOT)," Special Operations / Low Intensity Conflict Conference, 13 March 2006.

an integrated whole that is synchronized by the joint force headquarters."[125] Although this statement appeals to the interconnectedness of space operations, it also highlights two myths that are hindering planning and execution efforts.

First, the statement assumes the joint force headquarters is accomplishing the task of synchronizing forces. A joint force commander will often rely on the individual designated as the Space Coordinating Authority to perform this task. In practice SCA is delegated as an additional responsibility to the Joint Force Air Component Commander who often remains narrowly focused on air operations.[126] In his article, "Proposed Tenets of Space Power," Major McNeil highlighted a potential root cause of this narrow focus when he commented, "pilots speak of the complexities of running eight ship formations and designing air campaigns, insisting that a person can master the required skills only after spending years in the cockpit and commanding air forces. Yet, the Air Force considers pilots instantly capable of mastering the intricacies of optimizing space power."[127] The Director of Space Forces brings a skilled and educated space power perspective to the JFACC's staff, but often falls short of applying that perspective in support of all joint component commanders.

The second myth is the idea that space forces are synchronized across the joint force. As discussed earlier, the SCA is best suited to planning and staffing efforts and lacks the authority to compel agreement when needed. Additionally, SCA duties are often performed by the DIRSPACEFOR who is an Air Force advisor to the JFACC. According to USSTRATCOM, "The DIRSPACEFOR's ability to be successful in

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[125] FM 3-14, *Space Support to Army Operations*, 18 May 2005: 1-14.
[126] As discussed in Chapter 3, JP 3-14 states that any component commander can be designated as the SCA, but practice has normalized delegation to the JFACC.
[127] Maj Samuel L. McNeil, "Proposed Tenets of Space Power: Six Enduring Truths," *Air and Space Power Journal* xviii, no. 2, (Summer 2004):78.

supporting the CFACC and executing the SCA responsibility has been his ability to foster and nurture relationships with…various units and organizations. This highlights a potential weakness in the DIRSPACEFOR concept."[128] Based on this construct, SCA responsibilities are overly dependant on individual personalities instead of established processes and organizations.

The first step to achieving synchronized space forces is to empower the position with the right authorities. Replacing the Space Coordinating Authority in doctrine and practice with a Joint Space Synchronization Authority (JSSA) conveys the message that this position is jointly focused; empowered to arrange forces to maximize space effects in theater; and if delegated to the JFACC, is equal to other JFACC responsibilities such as Area Air Defense Commander, Airspace Control Authority, Collection Management Authority, Jamming Control Authority, and Combat Search and Rescue Authority which all carry commander responsibilities and authorities to arrange, deconflict, prioritize and task forces to accomplish the assigned mission. Similar to USSOCOM, the JSSA would maintain a broad, theater wide, perspective of space power working within established processes for space force enhancement and bridging gaps where processes do not exist or are flawed. The following is a possible job description for joint doctrine emphasizing the increased authority:

> The JSSA is responsible for synchronizing and integrating space capabilities in the operational area and has primary responsibility for joint space operations planning, ascertaining space requirements within the joint force, and when required executing space operations in coordination with other component commanders.

[128] Randy Hugenroth, "Joint Space Coordination Task Final Report," Booz Allen Hamilton Inc. support to USSTRATCOM J5, 28 February 2006, 5.

The primary advantage of the JSSA is the ability to fill three significant seams that represent obstacles to a joint force commander: the diversity of military, interagency and commercial space organizations and stakeholders; applying space power to the full spectrum of operations; and working through the imprecise boundary between theater and global perspectives of space power.

This research has concentrated largely on the integration of military space capabilities, but a joint force commander must focus on applying the nation's space power. Joint doctrine defines space power as "the total strength of a nation's capabilities to conduct and influence activities to, in, through, and from space to achieve its objectives."[129] Focusing only on military space capabilities limits the full potential of space power available to the JFC. In order to maximize space application a comprehensive view is needed to include commercial, civil, coalition, and other government agency capabilities. See Figure 6 for a representation of the various agencies involved.

[129] JP 3-14, *Joint Space Operations*, 2002: GL-6.

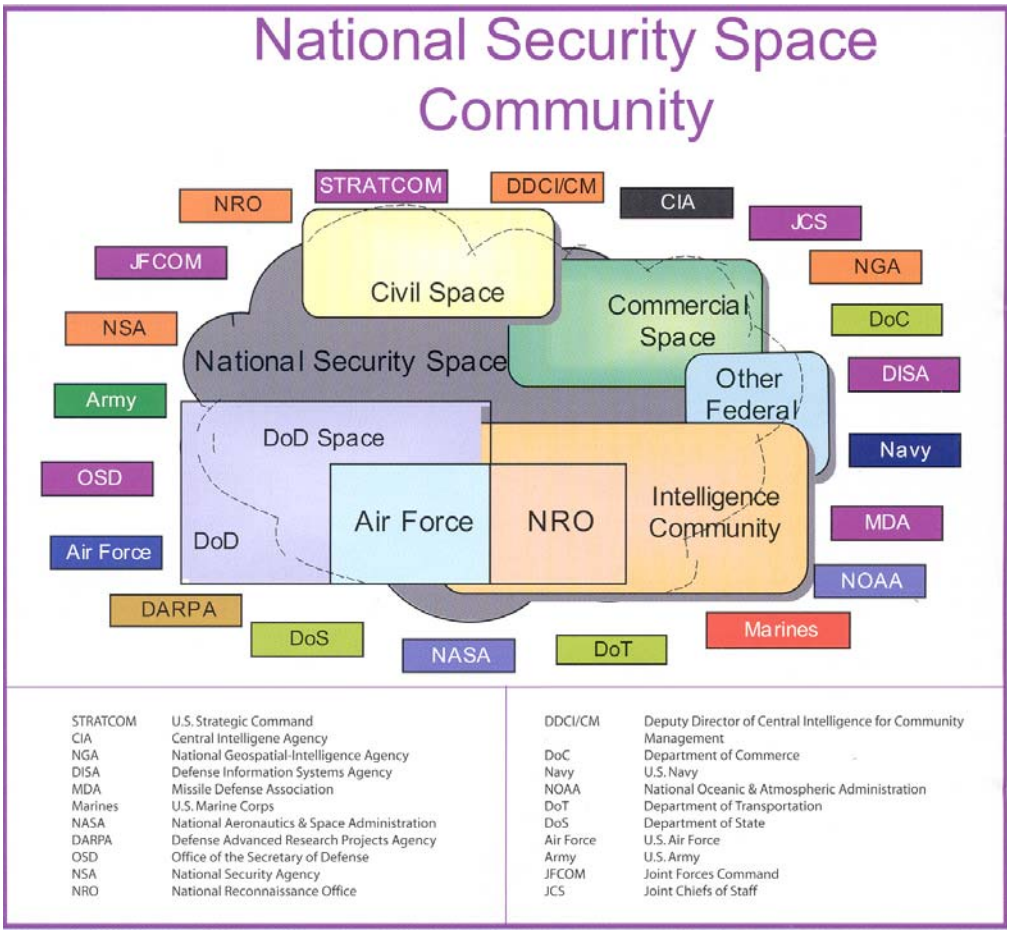

Figure 6. All Elements and Stakeholders of National Space Power[130]

A common pitfall in military doctrine and planning is the overly narrow focus on military space capabilities and processes. They represent the easiest to manage because they are within the span of control of military commanders. In order to effectively integrate with all elements of national power (diplomatic, information, military, and economic) a much broader perspective is required. "In applying space power, the JFC should comprehend that total strength stems from assorted sources of space capabilities. It is easy to fixate on the DoD and national satellite systems. However, the military campaign should consider all space capabilities

[130] LTC Curt Stover, "Space and the Nation's Security," *Army Space Journal* (Winter 2005): 18.

from military services, national and civil agencies, commercial companies, allied and coalition partners, multinational and consortium organizations, and independent foreign countries to conduct and influence space operations."[131] Maintaining a broad perspective of national and coalition space power also aids in filling the second seam.

As the military transforms to meet irregular, catastrophic and disruptive challenges the application of space power must also diversify. The explosive growth of tactical space application has primarily focused on supporting major combat operations, but recent military action has expanded US military involvement throughout the full spectrum of conflict. Like other elements of power within the DoD, the JSSA must also seek ways to apply space power throughout all levels of conflict and operations to include major theater war, humanitarian relief operations, and stability operations. An Air Force Space Command observation from Hurricane Katrina Relief Operations validated the need for a senior space officer presence, "There was a lack of space coordination, space unity of effort, and space unity of command. As of 13 Sep 05, [US Northern Command] has retained SCA, but when the NORTHCOM Ops Center was contacted, no one could identify a space POC working SCA issues."[132] Shaping, stability and humanitarian relief operations will require greater involvement of space officers due to the growing demand for space products and effects in military operations and information networks.

The final seam requiring synchronization of a joint force is the imprecise boundary between theater and global perspectives of space power and the resulting

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[131] Maj Tyler M. Evans, *Space Coordinating Authority: Information Services from Space*, ed. Lt Col Kendall K. Brown, *Space Power Integration: Perspectives from Space Weapons Officers* (Maxwell AFB, AL: Air University Press, 2006), 6.

[132] Air Force Space Command Exercise and Contingency Corrective Action Board, O-6 Working Group Results, "Space Coordination (HKRO) (U)," AFSPC/A3T, 13 September 2006. (SECRET)

control of space forces. The global reach and presence of space systems that makes them so desirable also creates conflict over control of tactical effects within a theater of operations. For example, who is responsible when tactical communications from ground combat units are jammed on a satellite that services a hemisphere? Is it the responsibility of a global authority or the theater commander? There is significant debate over where the boundary between theater effects end and global effects begin. Joint doctrine does very little to clarify the discussion. The Unified Command Plan designates USSTRATCOM as the functional combatant command (COCOM) for military space operations. To support USSTRATCOM's mission, the Joint Space Operations Center (JSpOC) lead by the Commander, Joint Space Operations (CDRJSO) was delegated tactical control of those units that produce space superiority, Global Information Services, and Global Surveillance, Tracking, and Targeting effects.[133] The JSpOC is USSTRATCOM's focal point for CONUS based space support to regional commanders and users (reachback support). According to Colonel Jay Santee, former JSpOC Director, "the JSpOC has assumed the premier role of linking tactical space operations to its strategic intent. It is the center of the operational art translating the national-level strategy and combatant commander's requirements and intent, into clear, attainable military objectives, tasking, and combat assessment."[134]

Even though the military community strongly debates what the optimum amount of control is and the amount of planning that should be accomplished through reachback support compared to organically in theater, there is consensus that a forward presence is needed to synchronize and integrate space forces and requests. The greatest value the

[133] Col Jay G. Santee, "Command and Control: The Future of Space," *High Frontier: The Journal for Space & Missile Professionals* 2, no. 3 (April 2006): 56.
[134] Ibid, 57.

JSSA may bring to the Joint Force Commander is the ability to create a seamless transition of effects and planning between global operations and tactical engagements.

Organizing to Execute Joint Space Requirements

In order to meet the growing demand for space effects the Joint Space Synchronization Authority must be adequately staffed for the additional workload and joint focus. The need for a supporting organization to coordinate efforts is documented in Army and Air Force lessons from OIF and exercises.[135] While there are a number of ways to organize space operations in support of a theater commander, this section presents a concept that allows for flexibility of location, chain of command, and for growth if required.[136] For the purpose of a common starting point, the underlying assumption is that joint force commanders will continue to follow joint doctrine and accept the recommendation from Air Force doctrine to delegate JSSA to the JFACC. If the JFC decides to retain JSSA or delegate the authority to a different commander the structure is flexible enough that it can support any component commander with JSSA.

Equipping the JFACC to Execute JSSA

In order to execute the duties of the JSSA a Theater Space Integration Cell is needed. Lead by the Joint Space Synchronization Officer (JSSO), a Brigadier General or

[135] According to the SMDC/ARSTRAT Lesson Learned database, "…establish a coordinating element when more than one ARSST is operating in the same theater. This would alleviate potential issues with consolidating information, logistical support, administrative support, deconflicting various issues, and synchronizing ARSST priorities within their supported commands." SMDC/ARSTRAT Lesson Learned, "Command and Control for Multiple ARSST and Army Space Assets in Theater (OIF-054)", 1st Space BN (5 December 2003), available from http://www.smdc.army.smil.mil/G3PE/LLS/LL_View_PF.asp (SECRET): SIPRNET, accessed 7 December 2006.

[136] The organization structure presented was first developed at the USCENTAF CAOC, Al Udeid AB, Qatar. The nucleus of the concept was created by former DIRSPACEFOR Col Michael Cary, and advanced by the author while deployed to the CAOC. Although the foundation of the presented organization structure is currently in place at the CAOC, this paper expands on the structure to make it more applicable to joint forces.

Colonel, and manned by joint, interagency and commercial partners, the TSIC would be the focal point for synchronizing space forces across the joint force including reachback support to continental US organizations, and ensuring component commanders are able to leverage space effects in planning and operations. The primary purpose is to synchronize space forces at the operational and theater strategic level. Although the primary authority of the JSSA would remain with the Component Commander, the JSSO would be responsible for the daily execution of responsibilities and tasks on behalf of the JSSA. Because of the joint and interagency representation, the cell would be fully equipped to provide perspectives for a wide range of theater, reachback and commercial space organizations. In this scenario where the JFACC is designated the JSSA, the Director of Space Forces is a likely individual to be given the responsibility of JSSO.[137] Similar in relationship to the Component Commanders who have a Service role and a Joint warfighting role, the JSSO/DIRSPACEFOR would maintain dual job titles. This allows for the formal recognition of the joint position and authorities as well as maintaining the Air Force role as an advisor to the JFACC. It is conceivable that as the JFACC's workload increases due to JSSA responsibilities, so will the workload of the JFACC as commander executing the space superiority mission.

Equipping the JFACC to Execute Space Superiority

The creation of the Theater Space Integration Cell provides the JFACC with an organization to execute the duties of the JSSA, but still leaves the JFACC and the Joint Air and Space Operations Center ill-equipped to fully meet the demands of the space superiority mission. Creation of a Joint Space Superiority Cell (JSSC) within the JAOC

[137] Although the DIRSPACEFOR is a likely candidate to be named the TSIC Chief this position could be filled by any officer; therefore, freeing the DIRSPACEFOR to focus only on Air Force service responsibilities to the JFACC.

will allow the JFACC to focus personnel and efforts on the growing needs for offensive and defensive counterspace operations and space situational awareness. This structure would focus the DIRSPACEFOR's duties to the original Air Force doctrine construct of service advisor to the JFACC or as the new TSIC Chief.

The JSSC would be the focal point in the JAOC for executing the Joint Force Air and Space Component Commander's responsibilities to conduct offensive and defensive space control planning and operations in order to gain, maintain, and exploit space superiority. Working for the JAOC Director, the JSSC would matrix across all divisions of the JAOC under the guidance of a JSSC Chief, and have joint representation to ensure integration with air, land, and maritime components. Headed by a Lieutenant Colonel, the JSSC Chief would oversee space activities within the JAOC that directly relate to planning, executing, monitoring, and assessing space effects within the Integrated Tasking Order.[138] Composed of space experts matrixed across all JAOC divisions and specialty teams, the JSSC's focus is to ensure the thread of space operations and effects is unbroken as it is woven throughout the Air and Space Tasking Cycle.

Synergy in the Joint Space Integration Division

The final approach to organizing space forces to support Joint forces is to combine the TSIC and JSSC to form a Joint Space Integration Division (JSID) in the Joint Air and Space Operations Center. The JSID is formed when the TSIC and the JSSC are co-located at the JAOC and presents an optimum configuration that maximizes joint and interagency perspectives, planning, and execution. The TSIC and JSSC would maintain their unique focus of theater integration and space superiority, but additional

[138] The terms Air Tasking Order (ATO) and Integrated Tasking Order (ITO) should be considered synonymous.

synergy and unity of command and effort is achieved through sharing location and leadership. In contrast to the advisory role in the TSIC, the JSSO/DIRSPACEFOR would become responsible for integrating and synchronizing the total space operations effort for the JFACC and JSSA and, in this capacity, would provide direction to the JSID to execute the space superiority mission.[139] The JSID Chief would ensure the division works as an effective organization in the JAOC and would act as the Deputy JSSO when required. See Figure 7 and Figure 8 for representative, but not exhaustive sample organization structures.

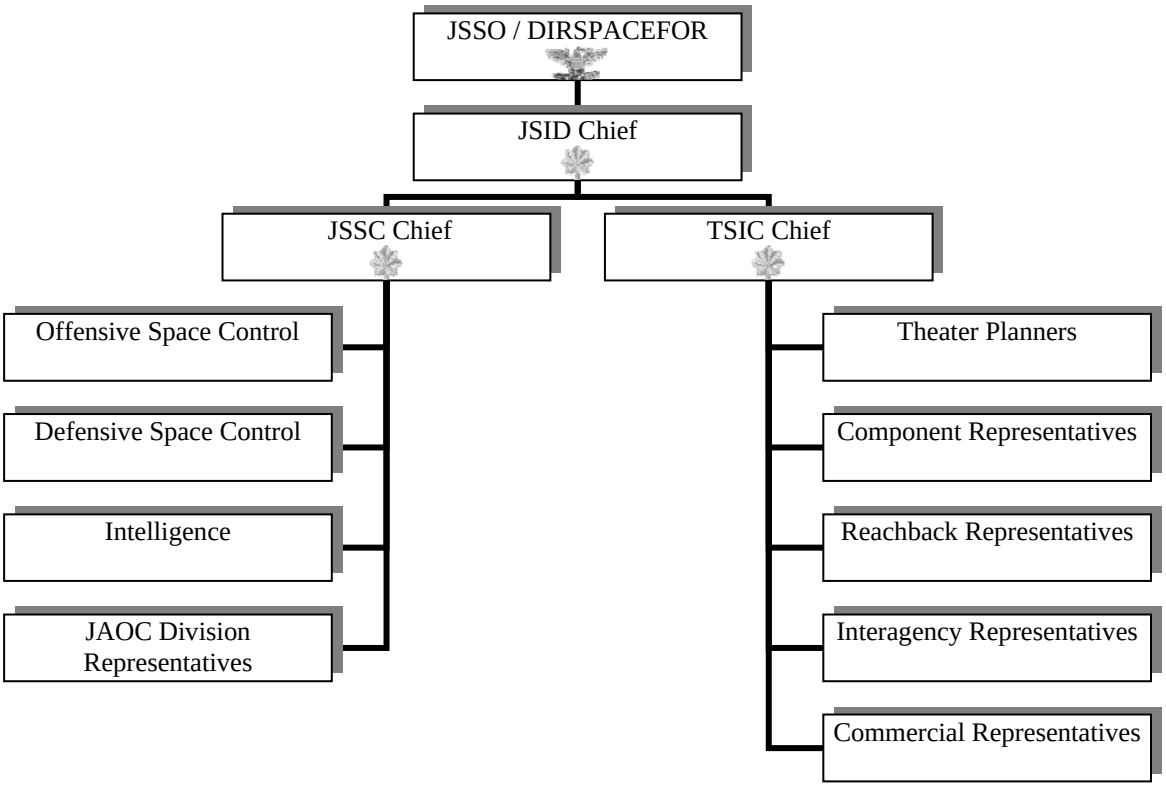

Figure 7. Organization of the Joint Space Integration Division

[139] Air Force Instruction 13-1AOC Volume 3, *Operational Procedures—Air and Space Operations Center*, 88. The Director of Mobility Forces exercises the same relationship with the Air Mobility Division.

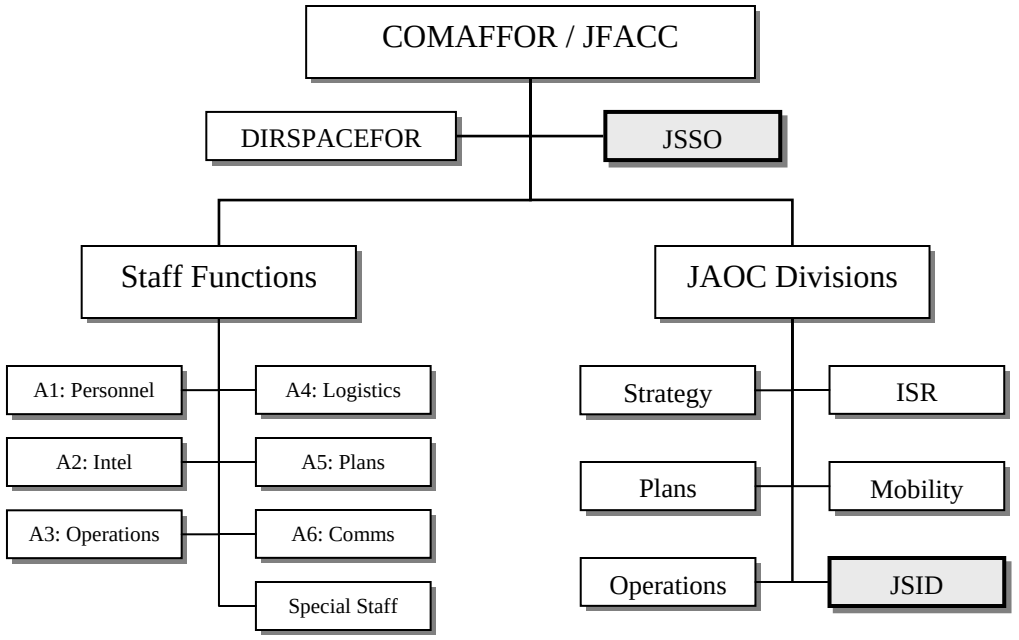

Figure 8. Location of the JSID in the JAOC organization.
The graphic depicts the dual responsibilities of the Air Force Service component commander and Joint functional component commander.

In this scenario, the JSSO works on behalf of the JFACC to accomplish JSSA duties of synchronizing and integrating space forces across the theater of operations through the TSIC while simultaneously providing direction to the JSSC to optimize the planning, execution, and assessment of the JFACC's space superiority mission. Finally, the DIRSPACEFOR retains the Air Force doctrine position of advisor to the COMAFFOR/JFACC for space issues.

This approach offers three primary advantages. First, it clearly identifies a senior space officer to perform the joint task of synchronizing space operations within a theater. The lines of authority from the Joint Force Commander through the Joint Force Air Component Commander with Joint Space Synchronization Authority to the Joint Space Synchronization Officer are clearly drawn. Confusion between service duties and joint

authorities is eliminated. The supporting TSIC, with joint manning adds to the clarity and recognition as a joint entity. The second advantage is that the organizations recognize the differences between the JSSA and the JFACC. Although both authorities are focused on joint operations, the JSSA's primary objective is to synchronize a "coalition of the willing" similar to what is found in a Joint and Interagency Task Force. Here, there is no clear unity of command, but there is significant need for unity of effort. In contrast, the JFACC is given command authority for the space superiority mission. A clear chain of command and overall strategic vision is needed to synchronize theater focused space effects within the integrated tasking cycle. Joint representation within the JSSC and close coordination with the TSIC will provide the wider perspective necessary to prevent a narrow focus of producing space effects in support of only air operations. The final advantage is that these organizations provide dedicated space personnel to execute both missions for the JFACC. The problem of air-centric leadership diverting personnel to work non-space related issues is overcome. Also, the additional space expertise provides a significant resource for more comprehensive planning efforts in the early stages of plan development when there is the greatest flexibility to incorporate space effects.

Summary

The increased complexity of space operations available to a Joint Force Commander requires the military to rethink how it approaches the task of organizing and synchronizing space forces. The military space community has outgrown the current concept of a Space Coordinating Authority which relies on a relatively small number of

space personnel embedded within the JAOC to accomplish both SCA and JFACC space superiority missions. To enable clear lines of authority and provide for a joint perspective of space power, a Joint Space Synchronization Authority supported by a Joint Space Synchronization Officer, Theater Space Integration Cell, and Joint Space Superiority Cell is needed. This concept for a new organization dedicated to space operations may invite the argument that it injects seams in the integration of space and other operations. In reality, the seams have always existed. Attempting to apply military, interagency and commercial space capabilities across the full spectrum of military operations highlights the fragmented nature of the community and emphasizes the need for a synchronized unity of effort. Creating an organization within the Joint Air and Space Operations Center focused on the application of space power is an important first step to optimizing space effects for the entire joint force as well as preparing for the opportunity where space may be a supported effort.

CONCLUSION

Do not repeat the tactics which have gained you one victory, but let your methods be regulated by the infinite variety of circumstances.

Sun Tzu
The Art of War, c.500 B.C.

The application and generation of space effects in support of the joint force commander has changed dramatically since the first US satellites were launched into orbit. The proliferation of space systems and their capabilities are inextricably woven throughout the fabric of American culture. But the asymmetric advantage that space systems provide has also become a critical, and potential soft spot, which US national elements of power have grown dependant. Concurrently, the growth of capabilities has lead to a growth in the number of space professionals and individual Service efforts to integrate space effects throughout military operations. Indeed, the absence of joint space organizations and a synchronization authority has hindered the optimization of space efforts across all forces integrated into a joint force commander's plan. Applying the warning by Sun Tzu in 500 B.C. the United States military must not rely on the methods that worked during Operation Desert Storm or Operation Iraqi Freedom but instead must improve upon those successes to seek better ways to operate. The creation of a Joint Space Synchronization Authority and the reorganization of joint space forces to support the synchronization and space superiority missions are ways to adapt to "the infinite variety of circumstances" the United States will see in the future.

This study finds that the US military must create a jointly focused command and control organization to meet the Joint Force Commander's growing demand for synchronized joint space capabilities. Although joint doctrine gives the Joint Force

Commander the authority to designate a Space Coordinating Authority, space operations remain focused within service needs instead of being integrated across the entire joint operations area.

The traditional approach to theater space integration leaves the responsibility to each service to integrate space effects for its component commander but neglects integration across all components. The Army deploys Army Space Support Teams and Space Support Elements to support the Joint Force Land Component Commander. The Air Force deploys a Director of Space Forces and augments the Joint Air Operations Center with space personnel to support the Joint Forces Air Component Commander. The Navy and Marines rely on individual ship and Marine Air Ground Task Force commanders to determine and meet Joint Force Maritime Component Commander space requirements. This approach is inadequate to address the growing role of space in theater operations because space forces are fragmented and compartmentalized along service lines instead of synchronized for joint warfighting.

Coordination authority, which lacks the authority to compel agreement and is best suited for staffing functions, is inadequate to deal with the growing demands across an entire joint force. Following the precedent forged by USSOCOM, which is responsible for synchronizing the Department of Defense's efforts in the Global War on Terror, a Joint Space Synchronization Authority is proposed to ensure space effects are integrated into component commander plans and operations and synergy is gained from unity of effort across the joint force. In order to work daily JSSA duties, a Theater Space Integration Cell with multiservice, interagency, and reachback organization representation is also proposed. A subset of synchronizing space forces is the growing

space superiority mission of the Joint Force Air Component Commander. A Joint Space Superiority Cell in the Joint Air Operations Center is proposed to provide a clear chain of command and overall strategic vision to synchronize theater focused space effects within the integrated tasking cycle. Joint representation within the JSSC and close coordination with the TSIC will provide the wider perspective necessary to prevent a narrow focus of producing space effects in support of only air operations and air-centric leadership diverting personnel to work non-space related issues.

The most likely objection to building organizations dedicated to space operations is the concern of creating seams in the integration of space and air, land, and naval operations. In reality, the seams have always been present and have served to assimilate space operations instead of integrating space effects. Service unique solutions have created stovepipes and the minimization of personnel dedicated to space operations in the Air Operations Center has left gaps in the strategic and operational vision for space operations. In contrast, a Joint Space Integration Division composed of the TSIC and JSSC enhances integration by focusing space efforts under a clear chain of command, with joint representation and sufficient space expertise.

The command and control of space forces has generated heated debate over the past few years. The primary advantage of the dialogue is the continuing effort to seek better ways to conduct operations. The SCA construct in joint doctrine falls short of meeting the growing demands of theater commanders. If space power is a priority for national security as stated in the 2006 National Space Policy, the joint community must continue to empower joint force commanders with the tools and authorities necessary to

optimize space capabilities. Establishing a properly empowered Joint Space Integration Division at the operational level is an important step in that direction.

GLOSSARY

AFSST	Air Force Space Support Team
AOC	Air Operations Center
ARSST	Army Space Support Team
ATO	Air Tasking Order
CAOC	Combined Air Operations Center
CCDR	Combatant Commander
CCS	Counter Communications System
CDRJSO	Commander, Joint Space Operations
CDRUSSTRATCOM	Commander, United States Strategic Command
CFACC	Combined Forces Air Component Commander
COCOM	Combatant Command
COMAFFOR	Commander of Air Force Forces
CONUS	Continental United States
DCS	Defensive Counterspace
DIRSPACEFOR	Director of Space Forces
DMSP	Defense Meteorological Support Program
DoD	Department of Defense
DSP	Defense Support Program
FA-40	Functional Area 40
GPS	Global Positioning System
GWOT	Global War on Terrorism
ICBM	Intercontinental Ballistic Missile
ISR	Intelligence, Surveillance and Reconnaissance
ITO	Integrated Tasking Order
JAOC	Joint Air Operations Center
JDAM	Joint Direct Attack Munition
JFACC	Joint Force Air Component Commander
JFC	Joint Force Commander
JFLCC	Joint Force Land Component Commander
JFMCC	Joint Force Maritime Component Commander
JOA	Joint Operations Area
JSID	Joint Space Integration Division
JSpOC	Joint Space Operations Center
JSSA	Joint Space Synchronization Authority
JSSC	Joint Space Superiority Cell
JSSO	Joint Space Synchronization Officer
MAGTAF	Marine Air Ground Task Force
MILSATCOM	Military Satellite Communications
MSI	Multi-Spectral Imagery
OCS	Offensive Counterspace
ODS	Operation Desert Storm
OEF	Operation Enduring Freedom

OIF	Operation Iraqi Freedom
OPE	Operational Preparation of the Environment
POC	Point of Contact
RAIDRS	Rapid Attack, Interference, Detection, and Reporting System
SATCOM	Satellite Communications
SCA	Space Coordinating Authority
SEWD	Space Electronic Warfare Detachment
SIRS	Satellite Interference Reporting System
SPOT	Satellite Pour l'Observation de la Terre
SSA	Space Situational Awareness
SSE	Space Support Element
SSO	Senior Space Officer
SWO	Space Weapons Officer
TIBS	Tactical Information Broadcast Service
TLAM	Tomahawk Land Attack Missile
TSIC	Theater Space Integration Cell
UNAAF	Unified Action for Armed Forces
USCENTAF	United States Central Command Air Forces
USCENTCOM	United States Central Command
USJFCOM	United States Joint Forces Command
USNORTHCOM	United States Northern Command
USSOCOM	United States Special Operations Command
USSPACECOM	United States Space Command
USSTRATCOM	United States Strategic Command

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14. ABSTRACT

The role of space operations in the United States military has matured significantly since the end of the Cold War. The transformation from strategic applications to tactical integration has increased the demands for effects achievable through joint space capabilities on and off the battlefield. The explosive growth of and demand for joint space capabilities have outstripped the joint community's ability to provide unifying doctrine and a command and control structure to meet the demands. Consequently, the military services have independently developed solutions and doctrine to meet the needs of their respective joint force component commander.

The thesis of this research is the US military must create a jointly focused command and control organization to meet the Joint Force Commander's growing demand for synchronized joint space capabilities. Although joint doctrine addresses the need for a space coordinating authority (SCA) separate from a commander to achieve space superiority, it does not provide sufficient joint authority to effectively execute the SCA role. Consequently, the Joint Force Air Component Commander has attempted to combine the roles in the Joint Air Operations Center resulting in a less than optimum integration of space into US joint warfighting.

To establish clear lines of authority and enable a joint forces wide perspective of space power, a Joint Space Synchronization Authority supported by a Joint Space Synchronization Officer, Theater Space Integration Cell, and Joint Space Superiority Cell is proposed. While these organizations could operate independently of each other at different locations, the greatest synergy is obtained by co-locating them in a Joint Space Integration Division in the JAOC. This construct allows for a jointly recognized and focused approach to space force synchronization and integration across all components.

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